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# INTERNATIONAL COMPETITION IN LAUNCH SERVICES

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## HEARING

BEFORE THE

SUBCOMMITTEE ON SPACE

OF THE

COMMITTEE ON

SCIENCE, SPACE, AND TECHNOLOGY

U.S. HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRD CONGRESS

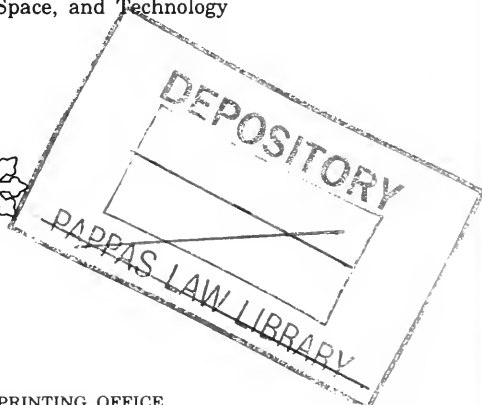
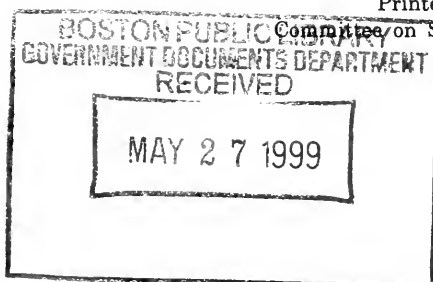
FIRST SESSION

MAY 19, 1993

[No. 22]

Printed for the use of the

Committee on Science, Space, and Technology



U.S. GOVERNMENT PRINTING OFFICE

WASHINGTON : 1993

71-260 CC

For sale by the U.S. Government Printing Office

Superintendent of Documents, Congressional Sales Office, Washington, DC 20402

ISBN 0-16-041362-1

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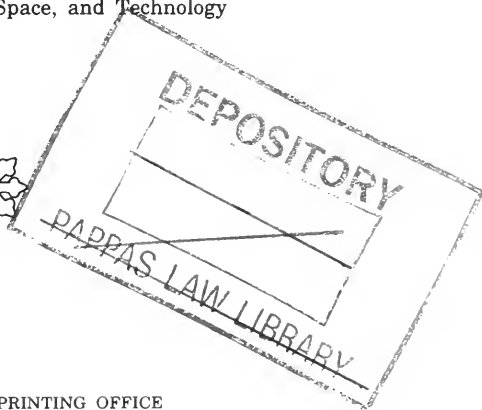
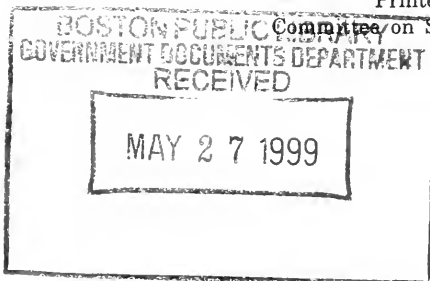
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\*Ranking Republican Member.

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# INTERNATIONAL COMPETITION IN LAUNCH SERVICES

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WEDNESDAY, MAY 19, 1993

HOUSE OF REPRESENTATIVES,  
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,  
SUBCOMMITTEE ON SPACE,  
*Washington, D.C.*

The subcommittee met, pursuant to call, at 1:55 p.m., in room 2325, Rayburn House Office Building, Hon. Ralph M. Hall [chairman of the subcommittee] presiding.

Mr. HALL. The Committee will come to order.

As you know, we were to have started at 1:30 and at 1:28 the 15-minute buzzer went off and there was a five-minute vote right after that. I'm sorry to delay important witnesses who are giving their time and their testimony here.

Without objection, permission is granted for coverage of this meeting by television, radio, and still photography. Is there objection? The chair hears none.

It is my pleasure at this time to introduce Dr. Ellen Ochoa, who flew on the April 8 flight, a native of California, who received her bachelor of science degree in physics from San Diego State University and master of science and doctoral degrees in electrical engineering from Stanford University. She is here. After joining NASA-Ames Research Center, she was selected as Chief of the Intelligence Systems Technology Branch and serving as technical and administrative head of 35 engineers and scientists researching and developing systems for aerospace missions.

Dr. Ochoa was named an astronaut in 1990. She is just down from an April 8 flight, and we are honored to have her here and really are pleased. She is the first Hispanic woman to fly in space, and I have always wanted to fly. At one time I thought I was lined up to get to fly, and if I did fly I would certainly want Dr. Ochoa to be on the flight with me.

We are honored to have you here.

Ms. OCHOA. Thank you very much, and I did bring a montage for the Committee. I would like to present it to Mr. Hall.

We flew a flag and a crew patch on our mission which are centered on this montage. They flew just under four million miles in space. And we have pictures of our launch and landing as well as some of the instruments that we carried on board. We had an atmospheric research flight, so we had ozone measuring instruments. We were also measuring some of the chemicals in the atmosphere that contribute to the destruction of ozone. So over the next few

months you will be hearing some results from the scientists on our flight.

Mr. HALL. Thank you very much.

This is presented to me for the Committee, and I will tell the committee that I certainly will keep this for the committee.

[Laughter.]

I'll take it to Texas for safekeeping and put it in my office there.

Ms. OCHOA. Thank you.

Mr. HALL. And it is my understanding that she has one just like this with Congressman Sensenbrenner's name on it—I had to ask that to be sure—and his will be presented to him at another time when some of his family is in the audience.

[Laughter and applause.]

Mr. HALL. All right. We will really come to order now.

I didn't know exactly what was to take place. They just said she had a gift for me, and you all know how Congressmen like gifts.

Thank you, Dr. Ochoa, and we laud you for your accomplishments and your service to this country.

Well, today we are going to open what promises to be a serious and perhaps a sobering dialogue on the future of space commerce in the post-Soviet era. This is an historic time because the U.S. has just reached an agreement in principle that would bring the Russians into the commercial launch market.

As most of you know, we are truly interested in the Russians and in their accomplishments in space. For example, we are curious how we could use the Russian Mir Space Station as a precursor facility to the U.S. led Space Station Freedom. In fact, we plan for U.S. astronauts to live and work 90 days aboard the Russian space station in 1995.

But today's hearing is not about cooperation, it is about competition. It is about a more down-to-earth matter that is of great import to us, money and jobs.

The commercial space business is a \$5 billion-a-year business of which launch services is just 10 percent or about \$500 million. It is not unimportant though. The U.S. has been losing market share to the French Ariane Launch System, and I think we will hear that very well laid out today, and I don't think we are going to be happy about what we are going to be hearing, and I think we have to really roll up our sleeves and determine that we are going to meet that and demand our space and our share of this market. Someone has let someone down to let the market atrophy away and to let the French get that start on us, whether it is the Congress not funding it properly or not giving it the proper support would be my best guess, but we will hear more from you men and women who will be testifying today.

If that trend continues or if it is worsened by the entry of China and Russia to the launch market, the domestic launch capacity is at the risk of extinction.

So today we are going to hear about foreign competition in the launch business, and to start off we will hear about the recently negotiated agreement under which the Russians will be allowed to enter the launch market.



We are honored to have Assistant U.S. Trade Representative with us, Peter Allgeier, who actually led the negotiations two weeks ago in Moscow.

Welcome back, and it says here I am supposed to read, "You may drink the water that is in front of you if you wish, but actually it may not be as safe as the water in Moscow."

[Laughter.]

And I'm reading this for my first time, so bear with me.

After Mr. Allgeier, we will hear from the affected segments of both sides of the launch industry, launch sellers and launch buyers and perhaps combinations. This is especially important because we can't go on with the satellite companies wanting one thing and the launch companies wanting another.

We have received testimony in the past that both industries support a \$12 billion rocket system paid for by the Air Force. This has been difficult for us to accept thus far, but our minds remain open. I hope our minds are more open that. I believe it was Prudential one time that I took my small company's indebtedness to and we were past due, and I asked for another \$3 million, which was a lot of money then, and they assured me they would listen to my ignorant proposal with an open mind. So perhaps that should be—put this in here next time, Bill, will you?

[Laughter.]

After Mr. Allgeier, we will hear from the affected segments of both sides of the launch industry, launch sellers and buyers. We need to get to the bottom line for this industry, and what is good trade policy and good foreign policy may not be the same thing. What may be great for peace may be bad business for American workers, and we need to see what is what, and we hope to know a little more after your testimony.

For example: Can the Russians enter the space launch market without killing the U.S. launch industry in the process? We need to have an answer to that.

Can the launch market, with so few flights each year, support two nonmarket participants, China and now Russia? That is of importance to us.

Finally, it is really going to require our best ideas to get the U.S. launch business back on a competitive footing, and what are some of the more pragmatic alternatives to the new launch system also known as Spacelifter?

Can we get there from here without going broke or going out of business? The answer is simple actually; the answer is, we have to, we don't have any alternative. There is no choice unless we are willing to have our military, civil, and commercial space activities become as dependent on foreign launch systems as we are dependent on them for energy.

So if no other Members, other than Mr. Sensenbrenner, have opening statements—perhaps you will—I will recognize Mr. Sensenbrenner at this time for an opening statement or anything he wants to say.

Mr. SENSENBRENNER. Thank you very much, Mr. Chairman.

First of all, I don't have a written opening statement, and I guess in the context of today's hearing that is probably good.

Secondly, Mr. Chairman, I really appreciate your not talking about drinking water from Milwaukee when you were talking about drinking water from Moscow. I think that that hits close to the heart of those of us from Wisconsin.

Seriously, on this subject, let me say that the attendance at today's hearing as well as the all-star panel of witnesses that we have, show that this issue is probably the second most critical issue that this country is going to have to decide with respect to civilian space activity, the first most critical issue, of course, being the space station and what NASA budget will be for the next fiscal year and the four following fiscal years after that.

We have gone from having 100 percent of the commercial space launch activities being carried on American rockets down to zero after Challenger and now back to 35 percent share of the market. That is not good, and particularly the Ariane has come and snatched an awful lot of the launches which used to be on American made rockets built by American workers in our country.

I think what we want to do is figure out how we can snare back an increasing share of that market in a manner that is consistent with good, sound financial practices as well as national policy, and obviously we are not going to have the money to be able to develop all of the new types of rockets where we can be able to launch payloads cheaply and in a cost effective manner. So that means that we are going to have to, in some respects, get international partnerships from the Russians or elsewhere.

On the other hand, I think it is extremely important that as we set up these international relationships we do not, in effect, give away the 35 percent share of the launch capabilities that we presently have to foreign manufacturers because then we will simply be seeing foreign rockets take off from the Kennedy Space Center and other American bases rather than having rockets that are made in the U.S.A. by our own workers, and I think this is where the witnesses today can give the committee some direction on how to walk that fine line in a manner that is consistent with our national interest as well as providing jobs that belong in America in our country.

Having said how important I think this hearing is, let me apologize for not being here later on. The Judiciary Committee is marking up the Freedom of Choice Act, and I am going to have to go back there to participate in that debate. But I will review the statements that have been submitted as well as getting a report from staff, and hopefully we can do something very constructive during this Congress in this area.

Thank you.

Mr. HALL. Thank you, Mr. Sensenbrenner.

The chair recognizes the gentleman from Texas, Mr. Johnson.

Mr. JOHNSON. Thanks, Mr. Chairman.

I don't know if I can match what Mr. Sensenbrenner did without a prepared statement.

Mr. HALL. Well, I can tell you why Mr. Sensenbrenner doesn't have a prepared statement.

Mr. JOHNSON. Why is that?

Mr. HALL. His man prepared mine for me.

[Laughter.]

Mr. SENSENBRENNER. If the gentleman will yield, that shows how well we work in a bipartisan manner in this committee.

Mr. HALL. The chair recognizes the gentleman from Texas.

Mr. JOHNSON. Thank you, Mr. Chairman.

I also would like to comment on your Russian water. I'll tell you what, I was over there, and all I could drink was bottled water; the other stuff made you kind of, you know, ill. So maybe we ought to get these guys into the bottled water business, and maybe that would help our space program.

I don't have any further comments. I agree with what you said, sir.

Mr. HALL. Thank you.

The gentleman from Indiana, Mr. Roemer.

Mr. ROEMER. Thank you, Mr. Chairman, and I hope you share the writing skills of the Minority speech writer there and his jokes as well, too—a very talented writer that the whole committee could use.

I would like to first start off by saying that I think this this—I agree with Mr. Sensenbrenner, this is one of the most important discussions that we will have before this committee. I would be very interested to hear about what foreign competition is doing, what we are doing domestically, and what trade agreements we are doing both to enhance our ability to compete and to make sure that we have a launch vehicle industry in the future.

It is almost similar to what we have done in competing with manufacturing cars in many ways. If we decided to stay with the same equipment that we manufactured our cars with in the 1930's and 1940's and so forth, never updated that machinery and equipment and manufacturing processes, we would not be able to compete with the foreign competition. In fact, recently, especially at the Saturn plant, we have done that, and hopefully we can have a discussion in this committee as to how to make sure that we decide to build a better launch system and when we decide to do that as well, too.

This issue has very, very dire consequences for our national security, it has dire consequences for our economy, and it has dire consequences for jobs as well, too, and we cannot afford to watch the demise of this critical U.S. industry just because right now, to some people, this market may be deemed to be small.

Our domestic launch capabilities are a system, an ability, and we must consider very carefully what the consequences will be if we surrender this capability.

So I would urge this committee to carefully listen to our witnesses and to support our industry here and to proceed very carefully as it could impact our economy and jobs and national security in the severest sense.

Thank you, Mr. Chairman.

Mr. HALL. Thank you, Mr. Roemer.

The chair recognizes the gentleman from Florida, Mr. Bacchus.

Mr. BACCHUS. Thank you very much, Mr. Chairman.

I want to say that this is one issue on which Mr. Roemer and I agree completely. This is a critical industry to the United States, and I want to applaud the administration for moving quickly to try to resolve this emerging issue.

Briefly, I would also like to extend a word of welcome to Mr. Allgeier. He and I were colleagues together some years ago in another day at the United States Trade Representative's Office. He has now been with the office, as you can see from his resume, for 13 or 14 years and worked in the State Department before that.

I know we have all read and heard criticism of some of our trade negotiators in recent years. Some of them have left the employ of the Government and gone on to work for domestic industries and for foreign countries and foreign industries as well. In part, I think, in many instances that is because we don't pay them enough to continue to work for the United States Government.

But I would like to point out that Mr. Allgeier has stayed, and, I can tell you, it has been at considerable expense. He could easily make three or four times in the private sector what he is making now for the United States Government. He is one of our finest trade negotiators, and I, for one, appreciate the work that he and his colleagues at USTR are doing.

Welcome, Peter, and thank you, Mr. Chairman.

Mr. ALLGEIER. Thank you very much.

Mr. HALL. Thank you.

The chair recognizes the gentleman from California, Mr. Rohrabacher.

Mr. ROHRABACHER. Thank you, Mr. Chairman.

This is a fascinating time to be alive, and I am just grateful that I have the opportunity to be in Congress at this time in history. We are going through a transition from one historic episode to another, and it is from the Cold War, which has been going on since the end of World War II into a new era, and we don't know what that era is going to be like, and during periods of transition all of the rules that we have been operating on in the last four decades are going to be changed.

We have a vote. Is that what this is?

Mr. HALL. Yes.

Mr. ROHRABACHER. Okay. Well, I will be short-winded then.

Mr. HALL. We will extend your time.

Mr. ROHRABACHER. All right.

Let me just note that whenever you are going through a period of change and the rules of the game are changing, people look at that as a threat or they can look at it as an opportunity. They can look at it as a threat to the way they have earned their money and the way they have set up their own system of dealing with production and distribution, or they can look at it as an opportunity because all sorts of new potential is going to open up in the world, and certainly international competition is raising its head, and competition is not a bad thing, competition is a good thing. Competition is what makes us improve our products. Competition is what made sure our automobile industry, as was stated, today is a state-of-the-art automobile industry instead of what it was heading for, which was some backwards, protected industry which would never be able to compete with international products.

We see international competition, and we also see areas where we can have international cooperation, and I am just as concerned about the international competition as anybody else in the short term, but that is only short term. In the long term, I think the

United States is going to be way out ahead of everybody else, and one of the ways we are going to do it is to take advantage of commercial and international cooperation, especially the cooperation that deals with cooperating with our former enemies.

The rules of the game have totally changed from the last 10 years. Ten years ago, we couldn't think about making a profit by cooperating with our former enemies. Now we can do it not only to the benefit of the whole world but to our mutually profitable situation for our own domestic producers.

So I'm very excited about that potential. I am concerned about the short term, because I have people in my district whose jobs depend on making these launch services and these launch vehicles that are being used today that aren't quite as competitive as they could have been had we had same rules that were laid down 10 years ago.

And one last thought as we go forward with this: The way we are really going to ensure that the United States and our people are employed and that our country prospers is to make sure that whatever we are doing beats the competition, that we are cheaper, that we offer more reliable service, and that may mean developing new technology, and I'm convinced we can do that too, we are in the middle of doing it, and five years or ten years from now, especially with this experimentation that is going on with the SSTO concepts, I think that we can leapfrog the competition and we will be able to outcompete the French and everybody else.

So, with that said, I am looking forward to hearing the testimony of our witnesses today.

Mr. HALL. I thank the gentleman from California.

This subcommittee has a policy of saving the best for the last, and we will recognize the gentlelady from California for that, Ms. Eshoo.

Ms. ESHOO. Thank you very much, Mr. Chairman. It is very generous of you to say that.

I don't oftentimes find myself agreeing with the gentleman from Southern California, but I applaud what he said. I think that he stated it eloquently, and I think that is exactly what we are here to discuss today, and I'm grateful to those that are here.

Two of the representatives that are going to be witnesses today are from my district. Rex Hollis is from Space Systems Loral, and Mr. Melvin Brashears from Lockheed, and I welcome them, and I'm glad to have some of the best and brightest from my district here instructing us.

But I would just like to make a brief mention of someone that I think has really distinguished herself both in communities at home and in the country, and that is Dr. Ochoa.

We simply do not have enough women that have moved into the area of science, and she has served as a role model both in the Hispanic community and the community at large. She has, of course, the distinction of being the first Latina to have been in space, and I think that that is what this country is all about, breaking barriers, becoming new role models, and I really salute her, I am delighted that she is here, and I pay tribute to what she has done, and if we can get more girls, young girls, going into what we em-

braced a long time ago, then all of these programs that we are talking about here will be that much more enhanced.

So welcome, and I salute you, and I know that we all do.

Thank you, Mr. Chairman.

Mr. HALL. Thank you very much.

We obviously have a vote on, and we have about nine or ten minutes, and then we have a series of votes, I understand, after that. We will return as quickly as possible. We will ask you to summarize as briefly as you can your testimony, because most of us have read your testimony and many of us have had the opportunity to visit with you, and then we will get right to the questions, that is the best way to lock horns on it, and we will lead it open to ask you questions. We know that we have some flight schedules that we have to recognize, and we will keep the faith with you on that.

Thank you. We will recess for 15 minutes, and five minutes of that has already gone.

[Recess.]

Mr. HALL. We will come to order for five minutes, and the chair would recognize Mrs. Dunn, the gentlelady from Washington, to submit her opening remarks into the record, or as she wishes.

The chair recognizes you, Mrs. Dunn.

Ms. DUNN. Thank you, Mr. Chairman. I will ask you to submit them for me into the record. I don't want to take more time away from our speakers.

I am eager to hear you.

Thank you.

Mr. HALL. Thank you, and, without objection, it will be accepted.

[The prepared statement of Ms. Dunn follows:]

OPENING STATEMENT  
CONGRESSWOMAN JENNIFER DUNN  
INTERNATIONAL COMPETITION IN LAUNCH SERVICES  
MAY 19 1:30 PM  
RHOB 2325

MR CHAIRMAN, SINCE 1983 THE U.S. GOVERNMENT HAS SOUGHT TO CREATE A COMMERCIAL LAUNCH SERVICE MARKET. PRESIDENTS REAGAN AND BUSH BOTH ISSUED COMMERCIAL LAUNCH POLICIES, CONGRESS PASSED THE COMMERCIAL SPACE LAUNCH ACT AND THE LAUNCH SERVICES PURCHASES ACT. TODAY, U.S. COMPANIES THAT MARKET LAUNCH SERVICES ARE IN COMPETITION WITH EUROPE, CHINA, RUSSIA, AND JAPAN.

OVER THE LAST 10 YEARS, CONGRESS HAS CONTINUED TO EXPRESS AN INTEREST IN ASSISTING THE INDUSTRY, BOTH BY TRYING TO PROTECT U.S. COMPANIES FROM UNFAIR PRICING FROM FOREIGN COMPETITORS AND BY INCREASING THE MARKET FOR COMMERCIAL COMPANIES.

SINCE WE BEGAN TO ENCOURAGE COMMERCIAL LAUNCH SERVICES USING U.S. ELV'S, THERE ARE NEW NON-MARKET ENTRANTS INTO THE SATELLITE LAUNCHING ARENA, NAMELY RUSSIA AND CHINA. WHILE WE HAVE BEEN ABLE TO CONDUCT NEGOTIATIONS WITH THE RUSSIANS AND CHINESE WE HAVE HAD THE GREATEST DIFFICULTY WITH THE EUROPEAN SPACE AGENCY.

IT SEEMS IN 1985, A U.S. COMPANY FILED AN UNFAIR TRADE PRACTICES COMPLAINT AGAINST ARIANESPACE, COMPLAINING THAT THE EUROPEAN GOVERNMENTS WERE UNFAIRLY SUBSIDIZING ARIANE. WHILE THE USTR INVESTIGATED THIS COMPLAINT AND FOUND THAT THE EUROPEANS WEREN'T PRICING COMMERCIAL LAUNCHES DIFFERENTLY THAN THE U.S., THIS DID RAISE THE QUESTION OF WHAT "RULES OF THE ROAD" TO FOLLOW WHEN

PRICING COMMERCIAL LAUNCH SERVICES. IN 1990 WE BEGAN TRADE TALKS WITH THE ESA TO ESTABLISH SUCH RULES AND TO LOOK AT HOW THE U.S. AND EUROPE SHOULD DEAL WITH THE ENTRY OF NONMARKET ECONOMIES INTO THE LAUNCH MARKETPLACE. THERE HAS BEEN ONLY ONE FORMAL NEGOTIATING SESSION IN 1991 THOUGH WORKING GROUPS ARE STILL MEETING TO DISCUSS THESE ISSUES.

I LOOK FORWARD TO HEARING FROM OUR 3 PANELS TODAY AS WE DELVE INTO THE AREA OF COMPETITIVE LAUNCH SERVICES. I AM INTERESTED IN HEARING FROM OUR TRADE REPRESENTATIVE, THE HONORABLE PETER ALLGEIER, ABOUT WHAT CONDITIONS HE BELIEVES SHOULD EXIST BEFORE ENTERING TRADE AGREEMENTS WITH NONMARKET COUNTRIES? SHOULD HUMAN RIGHTS ISSUES PLAY A ROLE IN DRIVING THE DECISION WHETHER WE TRADE WITH NONMARKET COUNTRIES?

CHINA HAS HAD ITS UPS AND DOWNS IN THE LAUNCH BUSINESS--NO PUN INTENDED. I AM INTERESTED IN HEARING ON WHETHER WE SHOULD RENEW OUR LAUNCH AGREEMENT WITH CHINA AND ARE THEY INTERESTED IN RENEWING THE AGREEMENT? THERE WERE SOME DIFFICULTIES WITH CHINA "LOWBALLING" LAUNCH SERVICES IN 1990 IN A CONTRACT WITH AN ARABSAT CONSORTIUM. THE U.S. DID NOT TAKE FORMAL ACTION AT THAT TIME. IS THERE A POSSIBILITY THAT THIS COULD OCCUR WITH THE RUSSIAN LAUNCH AGREEMENTS? HAVE WE PROVIDED SAFEGUARDS IN OUR NEGOTIATIONS TO PREVENT UNDER PRICING INCIDENTS FROM HAPPENING AGAIN?

CONCERNING SATELLITE EXPORTS, WITH THE UNITED STATES TRYING TO PROTECT OUR COMMERCIAL LAUNCH COMPANIES, WHEN DOES ADDED



**PROTECTION BECOME A PROBLEM FORCING A DECLINE IN SATELLITES AND LAUNCH SERVICES?**

**I AM SURE MY COLLEAGUES HAVE MANY OF THEIR OWN QUESTIONS TO ASK OUR ESTEEMED GROUP OF PANELISTS AND I LOOK FORWARD TO A PRODUCTIVE HEARING.**

Mr. HALL. We are in another vote at this time. We will recess at this time. It is a 15-minute vote.

[Recess.]

Mr. HALL. Okay. Obviously, we are going to have votes all afternoon, so what we will do is to let you give your opening statement, and if we have a vote we will two-platoon them, one of us will stay while the other one votes, and at least we will get it into the record, and we are going to still do our very best to accommodate everybody's time. Thank you very much.

The chair recognizes you.

**STATEMENT OF PETER F. ALLGEIER, ASSISTANT U.S. TRADE REPRESENTATIVE FOR EUROPE AND THE MEDITERRANEAN, OFFICE OF THE U.S. TRADE REPRESENTATIVE, ACCOMPANIED BY J. SCOTT MONIER, DIRECTOR FOR EUROPEAN INDUSTRY AND TECHNOLOGY**

Mr. ALLGEIER. Thank you very much, Mr. Chairman, for this opportunity to appear before the Space Subcommittee and to provide you and the other Members with USTR's views on international competition in the commercial space launch market and to describe the administration's efforts to negotiate trade agreements in this area.

I do request permission to summarize my testimony and have the written testimony submitted for the record.

Mr. HALL. Please do. Tell us something about your negotiations and what you think you accomplished.

Mr. ALLGEIER. Thank you very much.

If I could just introduce my colleague at the table here, Scott Monier, who is the Director of European Technology Issues and Industry Issues at the U.S. Trade Representative's Office, a member of our negotiating team.

From the trade policy standpoint, our overall goal in this sector is to prevent distortion in the terms of competition in the commercial space launch market, distortions which occur as a result of Government involvement in this sector. This requires addressing the different situations of the three other space launch providers that have a current capability to serve the commercial market—that is to say, Europe, Russia, and China.

In 1989, the U.S. Government did a memorandum of agreement with China which governs their participation in this sector until December 31, 1994. In 1990, we resumed consultations with the European launch providers on rules of the road for market economy participants in this market. We still do not have an agreement with Europe on those issues.

Today, I understand that your principal interest is the negotiation that we have had with Russia, and I would like to describe for you the agreement in principle that we reached with the Russians on May 6. We reached agreement on the elements governing Russia's entry into the commercial launch market during the transition period that it is undergoing for its economy and for this industry.

Let me say that the starting point of our negotiations with Russia was the recognition that Russia is a major space provider or has a major capability in the launch area but that neither the space launch industry nor the Russian economy currently operates

in an environment of market-based costs, and that creates some substantial difficulties for us.

Accordingly, we have sought to negotiate a transition agreement that would cover a period of approximately seven years. It would govern Russia's participation in this market through December 31 of the year 2000.

One other thing that I would like to emphasize is that in conducting these negotiations, pursuing our goals, we are very mindful of the diverse U.S. commercial interests in this sector, including launch providers, joint venture partners with the Russians, satellite manufacturers, and the users of satellite communications services. So we have tried to reach a balance of these important interests.

As I said, on May 6 we reached this agreement with the Russians. The key elements of the agreement are quantitative restrictions and pricing disciplines. On quantity, during this period up through the end of the year 2000, Russia may contract for up to eight launches to geosynchronous orbit or geosynchronous transfer orbit. There is also an anti-bunching provision which prohibits them from more than two launches in any 12-month period. The already contracted INMARSAT 3 launch is not included in this quantitative restriction of eight. So we have got the eight, plus the already contracted INMARSAT 3 launch.

In addition, Russia may contract for up to three launches to low Earth orbit as part of the Iridium system. So it is explicitly linked to the—or confined, I should say, to launches for the Iridium system. Any other proposals for contracts for either LEO orbits or other non-GEO orbits would have to be addressed on a case-by-case basis within the confines of the agreement, and the consultation provisions in the agreement.

On pricing, the Russians have agreed that their prices, terms, and conditions will be similar to the terms, prices, and conditions of comparable services provided by the Western launch providers. More specifically, if the Russians make a bid that is more than 7.5 percent below the lowest Western bid on a given transaction, that will trigger the special consultations in the agreement which would entail a review of that bid and put the burden on the Russians to justify that bid as a competitive bid.

There are other provisions in the agreement which we think encourage market-oriented reforms and address some other market concerns that we have. For example, cost-distorting government subsidies to the production or operations are prohibited; government inducements to customers or potential customers are not allowed; corrupt business practices are banned; and export credits, insurance, reflight guarantees, any other elements like that, must be on market terms.

The agreement also requires a satisfactory technology safeguards agreement for each payload. This agreement on May 6—as I said, it is a detailed description of the elements of a transition regime. The next step is to transform that detailed description into formal legal text. We have already begun that process. The U.S. side will prepare the legal text, have it translated into Russian, send it to the Russians, and then give them a week or two to review it; then we would get together again to finalize that text. So we think that

there is a good possibility that we would be in a position to have that text signed some time next month.

Our ultimate objective in this area, at least from the trade policy standpoint, is to negotiate an agreement among all the launch providers, the international launch providers, on permanent rules of the road to govern government involvement in this sector, and, Mr. Chairman, we look to the Space Subcommittee for guidance in achieving this objective and also for your support as we carry out the agreement with the Russians.

Thank you very much.

[The prepared statement of Mr. Allgeier follows:]

COMMENTS BY PETER F. ALLGEIER  
ASSISTANT USTR FOR EUROPE AND THE MEDITERRANEAN  
OFFICE OF THE UNITED STATES TRADE REPRESENTATIVE

BEFORE THE  
SUBCOMMITTEE ON SPACE  
HOUSE COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY  
WASHINGTON, D.C.

MAY 19, 1993

INTRODUCTION

Let me begin, Chairman, by thanking you and the members of the Subcommittee for this opportunity to lay out our views on international competition in launch services and to describe USTR's work in this area.

The international commercial space launch market is at an interesting juncture. Forecasts indicate a static demand for the launch of large telecommunications satellites to geosynchronous orbit, the mainstay of the commercial launch industry in the past. But new and promising ways of using space, such as constellations of communications satellites in low-earth orbit, microgravity processing and earth observation systems, are emerging, although many of these proposals remain highly speculative. At the same time, the number of launch service providers and the supply of launch vehicles grows. Russia is the most recent country to emerge as a capable and potentially significant new player, joining the People's Republic of China in the market previously dominated by the U.S. and Europe.

As the US Government agency responsible for negotiating trade

agreements, USTR has maintained an active dialogue with other space-faring nations in an effort to develop a framework for competition in the international market for commercial space launch services that offers a level playing field for US firms. As you know well, our dialogue with the Europeans, as represented by the EC and ESA, has been at a standstill for some time. We have, however, recently made significant progress in reaching agreement with the Russians on transitional arrangements to guide their entry into and participation in the international commercial space launch market. I am sure that agreement will be of great interest to you today.

#### **BACKGROUND**

USTR's involvement with international competition in the commercial space launch market dates back to 1984, when a US company filed a Section 301 petition alleging that Arianespace was subsidized by the French government and that it was dumping launch services in the US market. At the time, the President determined that European practices were not sufficiently different from our own (then primarily in support of shuttle commercial activities) to justify action. Nevertheless, the determination did not endorse European practices and did take note of the lack of international standards for government conduct in the launch services market and the problems which that absence caused.

This lack of standards led to discussions with the Europeans on what have come to be called "rules of the road" for commercial space. A major effort to reach agreement on standards for government involvement in the commercial space launch market, begun in the summer and fall of 1990, faltered at the end of 1991 when the European Space Agency and the European Community Commission were unable to resolve internal European differences over the responsibilities of these organizations for policies on commercial space launch.

In 1989, the U.S. had negotiated an agreement with China that provided for the latter's entry into the commercial space launch market. This question of dealing with the entry of non-market-economy countries was also addressed in our discussions with Europe. Some progress was made before discussions were suspended.

While resumption of those discussions awaited resolution of Europe's internal differences, developments in Russia required us to concentrate our efforts on Russia's desire to become a participant in the international commercial space launch market.

#### **RUSSIA**

At the Summit meeting between Presidents Bush and Yeltsin last June, the US made a significant first step in adjusting US policy on Russia's role in commercial space, reflecting the dramatic

economic and political changes taking place in Russia. The U.S. agreed, as a one time exception to previous US policies, to consider favorably a decision by the INMARSAT Organization to launch its US-made INMARSAT 3 satellite on a Russian launch vehicle, subject to agreement on satisfactory safeguards on the transfer of satellite technology.

At the same time, the U.S. and Russia agreed that in order to allow consideration of future proposals for Russian launches of US satellites while Russia's internal economic reforms were still in transition, the U.S. and Russia would enter into negotiations to develop international guidelines concerning competition in the launch of commercial satellites. Our ultimate objective was (and is) agreement among all the world's commercial launch providers establishing "rules of the road" to prevent distortions of normal competition in the market; however, a transition agreement setting out guidelines for Russia's participation in the market will provide critical predictability and stability for both the Russians and the US commercial launch industry. It will also incorporate important general principles and provisions relevant to our broader "rules of the road" negotiations.

Those discussions were initiated in Washington at the beginning of September last year. They began with the two sides exchanging information on their respective capabilities in commercial space launch, their views of the international market and their



expectations on their roles in that market.

Discussions resumed in December in Moscow. At that session, the U.S. focused on laying out its views on competition in the international market for commercial space launch. We also spelled out in detail our ideas on the appropriate limits for government involvement in the commercial space launch market, drawing on concepts developed in earlier talks with the European Space Agency. These discussions were directed primarily at the kind of behavior we would expect for market economy players, but Russia found our ideas acceptable as a goal for its reforms, with only minor differences on detail.

Russia, of course, is not yet a market economy, and thus our ideas for competition among market-economy providers of space launch services, while helpful to the Russians in directing the development of their industry toward a market-oriented course, were not immediately applicable to the Russian situation. Russia is arriving on the marketplace with major space capabilities, built in the old Soviet system of central planning and given emphasis by old Soviet military priorities. As a result, Russia has a potent space industry without market-based costs and operating in a macroeconomic environment that is chaotic and unstable. Until the industry has made sufficient progress toward market-oriented operations and the Russian macro-economic environment provides it a basis for rational market decisions, special transition

arrangements are going to be necessary to prevent the offer of Russian commercial space launch services from distorting normal competition in the international market.

We had a preliminary exchange of ideas on transition arrangements for Russian entry into the commercial space launch market during our December round of talks. After those meetings, we formulated our ideas into an outline of the main elements of a transition agreement to govern Russian entry into the market. This outline was passed to the Russians at the Vancouver Summit and served as the basis for our May 5-6 negotiations in Moscow. That session was cooperative and productive. We were able to reach agreement in principle on essentially all the main elements for a bilateral agreement governing the transition phase of Russia's entry into the commercial space launch market.

That agreement with the Russians hinges on two key elements, both intended to minimize any distortions that Russia's entry into the international commercial space launch market might cause. These two elements are quantitative restrictions and pricing discipline.

On quantity, we have agreed that Russia may contract for up to eight launches of satellites to geosynchronous earth orbit (GEO) or geosynchronous transfer orbit (GTO) between signature of the agreement and December 31, 2000, when the agreement expires. To prevent an excessive bunching of launches, we have also agreed that

the Russians will not contract for more than two launches in any twelve-month period. The INMARSAT 3 agreement is already signed and is considered in addition to the launches in the agreement. We have also agreed that Russia may contract for up to three launches to low earth orbit (LEO) for the Iridium system. The parties will continue to review the development of the LEO market in annual consultations provided for under the agreement. Other specific proposals for LEO launches or launches to other non-GEO orbits will be considered on a case-by-case basis.

On pricing, the agreement provides that Russian pricing, terms and conditions will be "similar to" the prices, terms and conditions for comparable services from market economy countries. The agreement would require special consultations to review any Russian bid that was more than 7.5 percent below the lowest US or West European bid.

Other provisions of the agreement encourage market-oriented reforms in Russia and address general market concerns. Distorting subsidies are prohibited; government inducements to customers are not allowed; export credits, insurance and reflight guarantees must all be on market terms; information will be provided to ensure transparency; and corrupt practices are banned. The agreement will also require satisfactory technology safeguard controls for satellites. Finally, it will not be possible to implement the agreement without arrangements to prevent proliferation of Russian

missile-related technology or if Russia should engage in missile-related transfers that would be sanctionable under US law.

We are confident that this agreement will achieve its three main goals:

- to encourage market-oriented reform of the Russian economy and space-launch sector,
- to permit Russia to enter promptly the market for space launch services at fair and remunerative prices, and
- to prevent disruption of normal competition in the international market for commercial space launch services.

#### THE EUROPEANS

As I have noted, our ultimate goal is a set of "rules of the road" for all participants in the commercial space launch market. Our agreement in principle with the Russians is bilateral. Shortly after we began our discussions with the Russians, our European counterparts in the EC and ESA reconciled their internal differences and expressed an interest in joining our talks with the Russians. We were hopeful that we had an opportunity to resume our

efforts to achieve our goal of a multilateral agreement. We scheduled a preliminary round of discussions with the Europeans just before our December meetings with the Russians.

Unfortunately, those contacts with the Europeans revealed insufficient interest on their part in reaching an agreement that would address our central goal of establishing standards for government support during the various phases of launch activity -- development, production and operations. The Europeans also linked agreement on "rules of the road" to access to government launch procurements in the U.S.

Europe has also shown reluctance to see any significant Russian entry into the international commercial space launch market. Our December discussions with the Europeans, as well as consultations with them just prior to our most recent negotiations with the Russians suggest that any interest Europe may have in a multilateral agreement is focused on strictly limiting Russian access to the market.

With regard to the general market principles of importance to us in any agreement with the EC and ESA, the Europeans urged us to eliminate those elements of our proposal to the Russians addressing the limitation of subsidies and adoption of other market-oriented disciplines as unacceptable to them. I regret to say that there does not appear to be any near-term prospect for a significant

shift in this European position.

#### CHINA

The agreement we reach with Russia will not be directly linked with the U.S.-China Memorandum of Agreement on commercial space launch negotiated in 1989. That agreement is independent of the Russian agreement and runs until December 31, 1994.

The agreement in principle we have reached with Russia is nevertheless similar to the China agreement in many of its provisions. Both contain important statements regarding the role of governments in the space launch market, including rules for subsidies, inducements and insurance. Each establishes a transition mechanism addressing both quantity and pricing. The Russian agreement could also establish important refinements on those disciplines, especially in the area of pricing, that will be relevant for our discussions with the Chinese.

#### OUTLOOK

Our next task is to formalize our agreement in principle with the Russians in an actual legal text. USTR and other interested agencies are hard at work on that process. We expect to meet with the Russians soon to iron out any remaining differences that are brought to light in that text. We believe it will be a good

agreement, one balancing the interests of the US space launch industry with those of satellite operators and users while at the same time encouraging market-oriented reform in Russia and fair play in the international marketplace.

Beyond that bilateral process, our ultimate objective remains a multilateral agreement providing overall discipline on government involvement in the international commercial space launch market. Such an agreement should address rules on government supports in market economies as well as the special transition arrangements needed to deal with non-market economies and economies in transition. We regret that so far it has not been possible to negotiate such an agreement with Europe, but we hope that the US-Russian agreement might provide a catalyst for their interest.

Mr. HALL. We thank you.

#### LAUNCH CONTRACTS WITH THE SOVIETS

Mr. HALL. The difference between the terms "contract" and "award launch" under the agreement—the Russians have eight contracts over the seven and a half years. Does that mean eight launches?

Mr. ALLGEIER. You are correct in saying that the focus is on the contracts. They would have those contracts. The launches, therefore, would not have to occur within that seven-year period. They could, for example, end up doing a launch in the year 2001, which would be after this agreement was over.

Mr. HALL. In the China agreement they used the word "launch."

Mr. ALLGEIER. That is right.

Mr. HALL. And there is some uncertainty there now.

Mr. ALLGEIER. Well, one of the things that we want to avoid in the Russian agreement is the phenomenon that when you get near the end of the period of the agreement, if it is based on launches, you have got the other party out there making contracts for the subsequent period, and that can prejudice your negotiations in the subsequent round, and so we want to avoid that by focusing on launches, and the other element is that, recognizing the reality that it is a little bit difficult to time your launches all that precisely, especially if you have an anti-bunching provision.

Mr. HALL. What do you think are the chances that the Russians will sell all eight of their contracts?

Mr. ALLGEIER. I think they are going to try very hard. We have to assume that they are going to try very hard to do that.

Mr. HALL. So you don't really mean it is a contract for 20 satellites?

Mr. ALLGEIER. No. It is a contract for a launch of a satellite.

Mr. HALL. Okay. My last question is: What can go wrong between now and final approval of the agreement? Is it pretty well tied together, tied down?

Mr. ALLGEIER. We believe it is. The agreement that we have at this point is quite detailed. It has been initialed by both sides. Certainly there will be some negotiating over the legal text, but we believe that we have covered all of the important elements.

Mr. HALL. We will have other questions that I am going to want to submit to you in writing, but we have to let other Members here—

Mr. ALLGEIER. That is fine.

Mr. HALL. Like: In what ways is the agreement with the Russians an improvement on our 1989 agreement with China? and the relationship of Russia's economic behavior relative to commercial space launch and how it is regulated by the agreement. Are the U.S. obligations under this agreement linked in any way to the future political behavior of Russia?

Those are some things that are of import to us, and we will submit something to you for the record.

Mr. ALLGEIER. We will be happy to respond to any questions you have.

Mr. HALL. The chair recognizes the gentleman from California, Mr. Rohrabacher.



## U.S. INTENTIONS WITH SOVIET AGREEMENT

Mr. ROHRABACHER. Could you give me a brief summary of what your intention was when you entered the negotiations for these agreements? What did you want to accomplish? and did you accomplish what you set out to do?

Mr. ALLGEIER. We wanted to accomplish an agreement that would have quantitative restrictions, as I said, that would balance these different interests in the United States and that would have some fairly precise guidance on the pricing issue. Those were our two principal objectives, and I think that we have achieved those.

Mr. ROHRABACHER. You talk about pricing. How much money do you expect that the Russians are going to be making from the deals that are permitted by this agreement over the next seven years?

Mr. ALLGEIER. Well, if they were to have contracts on all of their eight launches, that, I think, would be something on the order of probably \$350 million, if my math is correct, and then there would be the three Iridium; I am not sure how much they would earn from that, but if you assume about \$45 or \$50 million a launch, then you are probably talking about a total of \$500 million to \$600 million over that period.

Mr. ROHRABACHER. And these launches that we are talking about—this is a deal between the United States and Russia. Does it relate to commercially available launches? Are you talking about for everybody in the world or just to American customers?

Mr. ALLGEIER. No. Everywhere in the world. It is the international market, so it can be satellites that are contracted by third countries or international organizations.

Mr. ROHRABACHER. And you believe that this—you know, eight launches or eight contracts are what we are talking about. This is not a substantial number actually, is it?

Mr. ALLGEIER. Well, it is a small market, and, you know, every contract counts. So I don't—I don't want to minimize the significance of the Russians being in there bidding and able to possibly win as many as eight contracts.

Mr. ROHRABACHER. Do you think if the price per launch was brought down across the board generally because of new technological developments that the market would expand?

Mr. ALLGEIER. I certainly don't claim to be an expert in this market, but that would seem to be a reasonable expectation.

Mr. ROHRABACHER. In terms of the Russians and their possible involvement with the space station, for example, would this agreement have anything to do with limiting their participation in the space station?

Mr. ALLGEIER. No. This deals only with commercial payloads, and it does not cover payloads that are Government payloads, either military or the civilian space programs.

## JOINT VENTURES

Mr. ROHRABACHER. And how does this agreement relate to the development of international, for example, joint venture type situations with Lockheed or whoever else in the United States would want to join in with a joint venture type operation?

Mr. ALLGEIER. How the Russians go about marketing their services is their business. As long as they abide by the various rules about no inducements and unfair export credits and things like that, how they structure it is their business.

Mr. ROHRABACHER. I was very pleased that you were taking a broad view when you were talking about America's interest in commercial launches and the space industry because we have to be very concerned. McDonnell Douglas, of course, produces the Delta rocket system right there in my own district, but we also have people right in my own area that also produce satellite systems, and you have got people—you know, you have got a varied interest there, and I think you are to be commended for trying to balance out these interests, and it is quite a task, and I'm looking forward to working with you, and I want you to know that my office is available to you, and I know that Chairman Hall and the other members of this committee, although we are not present right now simply because of the way things worked out today, but I know we are very anxious to work with you to make this work to the benefit of both Russia and the United States, and if we work hard at it we can accomplish that goal.

Mr. ALLGEIER. Thank you very much, Mr. Congressman.

Mr. ROHRABACHER. Thank you, Mr. Chairman.

Mr. HALL. Thank you.

The chair recognizes the gentlelady from California, Mrs. Harman.

Ms. HARMAN. Mr. Chairman, I'm mindful that many witnesses have waited a long time to testify today, so I'll submit any questions in writing, but I do want to welcome Mr. Allgeier.

Mr. ALLGEIER. Thank you.

Mr. HALL. Thank you very much.

At this time I think, Mr. Allgeier, if you can—what is your time element? Can you stand by a little while?

Mr. ALLGEIER. I'll be happy to stand by as long as you want me to, Mr. Chairman.

Mr. HALL. I think it would be wise to put panel two and panel three at the table now. We have Mr. Dorfman and Mr. Teets, who have a critical timing transportation factor, and we want to of course honor that.

We are going to lose half of our audience, I believe.

I guess I won't ask if everyone comfortable, I'll ask is anyone comfortable.

[Laughter.]

All right, however you want. Mr. Teets, do you want to lead off? And I sure do suggest that you summarize as much as possible. You know, we will telescope you into this meeting, and there probably won't be another vote for six hours, but if we start taking you one at a time again, there will be a vote in 15 minutes.

So we will just try to work together, and we are going to get a good record because we are going to have each of your bits of written testimony, if there is no objection by Mr. Rohrabacher or Ms. Harman, put into the record. It will be a part of the record just as much as if you had spoken it, and we will have some questions that we will submit to you and ask you to help us with that in the event we don't get to ask them here.

So, with that, the chair recognizes Mr. Teets.

**STATEMENTS OF PETER B. TEETS, PRESIDENT, SPACE GROUP, MARTIN MARIETTA CORPORATION; MICHAEL W. WYNNE, PRESIDENT, GENERAL DYNAMICS SPACE SYSTEMS, AND CHAIRMAN, COMMERCIAL LAUNCH SERVICES; STEVEN D. DORFMAN, PRESIDENT AND CEO, HUGHES SPACE AND COMMUNICATIONS COMPANY; MEL R. BRASHEARS, PRESIDENT, LOCKHEED-KHRUNICHEV-ENERGIA INTERNATIONAL; ALAN B. KEHLET, VICE PRESIDENT AND DEPUTY GENERAL MANAGER, SPACE TRANSPORTATION DIVISION, SPACE SYSTEMS, McDONNELL DOUGLAS AEROSPACE; DAVID W. THOMPSON, PRESIDENT AND CEO, ORBITAL SCIENCES CORPORATION; WARREN Y. ZEGER, VICE PRESIDENT AND GENERAL COUNSEL, COMSAT CORPORATION; AND REX R. HOLLIS, VICE PRESIDENT, POLICY AND PLANS, SPACE SYSTEMS/LORAL**

Mr. TEETS. Thank you very much, Mr. Chairman. I'm pleased to be here today and have this opportunity to speak on a subject that I think is very important, and I will summarize my remarks, and I'm thankful that you will put the written word in the record, so to speak.

Martin Marietta Corporation, whom I represent as president of the newly formed Space Group, is in somewhat of a unique position because we now are a major supplier of satellites in the commercial communications satellite business. We also very actively are involved in the space launch business. So to a very real degree we have been struggling with what we think is an appropriate policy to come down that reflects both sides of the equation, so to speak.

I believe strongly, and Martin Marietta believes, in free international trade, and yet we believe in that free trade that it needs to be carried out on a level playing field, and that raises a couple of dilemmas. In the case of the satellite world, we compete regularly with Matra Marconi, with other foreign suppliers of commercial communications satellites, and we feel we need to be allowed the freedom to launch those vehicles or have the customers of those vehicles pick whatever launch system they desire. To do otherwise would be to put us at a competitive disadvantage vis-a-vis the rest of the world.

Now, having said that, I would also tell you that I believe strongly that in the launch systems side of the equation there is a national imperative that the United States have a capability for assured access to space. It is important for us to have a vital and a viable domestic space launch industry that can, in times of need, launch spacecraft for national security missions and other reasons. Our dependence on space, as you well know, is growing.

So therefore I would say that in the space launch business it would be wise to support a policy that puts all United States civil and military satellites on U.S. launchers. That is to say, U.S. Government spacecraft should fly on U.S.-supplied launch systems.

Our market, the U.S. Government market, for spacecraft is large enough then, I believe, to properly support a viable domestic launch industry. Now I would couple this last statement with a strong vote of support for the United States Government to improve and upgrade and update the launch system infrastructure

that exists in our country today. Many of the launch complexes, many of the—much of the equipment that we use today is from the Apollo era, and I would say to you that with the possible exception of Launch Complex 40 at Cape Canaveral that we are operating with outdated infrastructure.

Therefore, I am in strong support of the Air Force's proposed Spacelifter program, and I believe that the Spacelifter program, if properly funded and developed in a logical sequence, can provide us with a strong launch system that can level the playing field in that international marketplace.

So the sum and substance of my remarks are three fundamental points: one, that for commercial satellite contractors, that U.S. producers be allowed to fly on any launch system that exists in the international marketplace; two, that all U.S. Government satellites fly on domestic launch systems; and, three, that a program of vigorous investment be taken by the United States Government to update and upgrade our Nation's launch infrastructure which will allow future, very cost competitive products to be delivered by American launch system companies.

Thank you very much, Mr. Chairman. I appreciate the opportunity to make those remarks.

[The prepared statement of Mr. Teets follows:]

**Statement of Peter B. Teets**  
**President, Space Group**  
**Martin Marietta Corporation**

May 19, 1993

**TESTIMONY BEFORE THE SPACE SUBCOMMITTEE OF THE  
HOUSE SCIENCE SPACE AND TECHNOLOGY COMMITTEE**

**Mr. Chairman, Members of the Committee, thank you for the opportunity to appear before you today to discuss international competition in space launch services. I represent the "new" Martin Marietta Corporation, which combines the original Martin Marietta with the former General Electric Aerospace. Our interest in the subject of these hearings derives from our involvement in many of this nation's most important space launch and spacecraft programs.**

**We build military spacecraft for programs such as the Defense Satellite Communication System, Global Positioning System, and Defense Meteorological Satellite Program; civil spacecraft, such as Magellan, Mars Observer, TIROS, Landsat and EOS-AM; and commercial spacecraft for Intelsat, Inmarsat, AT&T and a host of other domestic and international customers.**

**We build the Space Shuttle External Tank for NASA. We are the prime contractor for the Air Force's Titan IV, which is this nation's largest expendable launch vehicle. Its mission includes the launching of some of America's highest-priority payloads. Our Titan III carried NASA's Mars Observer into orbit last fall, and our Transfer Orbit Stage propelled it towards its rendezvous with Mars, which is scheduled for this coming August. We have converted the Titan II from an ICBM to a satellite launch vehicle, and are in the process of a similar conversion of the Minuteman II under the Multi-Service Launch System program.**

**We are proud of the part we play in developing our country's space technology, but we are troubled by current trends. The political and economic realignments now underway in the world pose major challenges to America's preeminence in space, and require a national space policy which keeps pace with and accommodates these changes.**

One of the most significant changes is the growing pressure being brought to bear on our industry by foreign competitors. In striving to sell our commercial satellites, for example, we go head-to-head every day with Matra Marconi Space, British Aerospace and other very capable bidders. I am happy to say that we have been quite successful, given the relatively level playing field which has existed up until now.

But if we create a perception among satellite buyers -- typically foreign governments or international consortia -- that American commercial satellites come with political and financial strings attached, that success will be difficult to sustain. Quotas, pricing thresholds and other restrictions on our ability to fly on foreign boosters, however well-intentioned, will have the inevitable consequence of placing us at a disadvantage vis-a-vis foreign satellite builders. To the extent that they are free to fly on low-priced launch vehicles and we are not, foreign-built satellites will be more attractive and affordable to buyers who, in most cases, are the ones choosing the launch vehicle.

In order to maintain a level playing field, the U. S. should not impose restrictions on the ability of U. S. commercial satellites to fly on foreign boosters. To continue to do so will be to ultimately forfeit the market and put thousand of skilled Americans out of work.

But what of America's launch vehicle builders, who themselves are faced with a less-than-level playing field? Given Martin Marietta's presence in both the space launch and satellite markets, I can assure you that we have struggled, in much the same way that you are struggling, to achieve a proper balance between competing interests in this equation. If we seek to protect one, we may harm the other. In this instance, as in so many others, there appears to be no perfect policy which will satisfy every interested party and anticipate every contingency.

But the booster side of the equation has a national security component which is compelling. As a nation, we are heavily dependent upon access to space for intelligence, warning and assessment, communications, weather observation and many other functions. Our continued ability to operate there, unrestricted by international circumstances, will require a healthy, American industrial base capable of producing and operating space boosters far into the foreseeable future.

In order to assure our country's access to space for critical missions, we should continue the current policy which requires that U.S. government payloads, whether military or civil, be launched aboard U.S. launch vehicles. In this way, a sufficient and predictable business base will ensure the viability of our domestic launch industry. If we permit the erosion of that base, we risk a repetition of the Challenger aftermath, when our ability to launch key payloads was jeopardized by an unforeseen event. Can we assure our citizens and our military men and women overseas that we will always be able to use space, as we did in Operation Desert Storm, to multiply the effectiveness of our forces and save lives in the bargain? If we permit our access to space to become hostage to the goodwill of a foreign country, the answer to that question will not be affirmative.

Both our economy and our security would be well-served if we turn our attention to one element shared by the government and commercial space communities: Infrastructure. While there are notable exceptions, such as the Air Force's state-of-the-art launch complex 40 at Cape Canaveral, for the most part we are living with Apollo-era structures and equipment. If we are to keep faith with our space heritage, we must make the commitment to a next-generation family of launch vehicles and to highly efficient launch complexes to support them. The Air Force "Spacelifter" concept, which includes simplified vehicle and payload processing, offers a promising beginning to the fulfillment of that commitment.



In closing, let me say that even a modernized infrastructure will be for naught if we make the wrong decisions on the launch vehicle question. A dual-track approach, in which U.S. launch vehicles launch U.S. government payloads, and commercial satellites are launched in a competitive, multi-national launch vehicle environment, strikes a proper balance between the interests of two important American industries, while preserving U.S. independence in the exploitation and exploration of space. It is a practical solution to a complex problem. As you confront the difficult cases in the days ahead, this policy can provide the foundation for a fair and uncomplicated set of guidelines which will serve our national interest in this important arena.

Thank you.

Mr. HALL. Thank you. And I guess at this time the chair will recognize Mr. Wynne. We may jump over to Mr. Dorfman if we get too close to his 4:30 departure.

Yes, sir?

Mr. TEETS. May I, sir?

Mr. HALL. We all left when we had to go, so you can do the same thing.

Mr. TEETS. Thank you very much.

Mr. HALL. Thank you for your patience and your testimony, in that order probably.

Mr. WYNNE. Mr. Chairman, I appreciate the opportunity to speak with you.

My name is Mike Wynne. I am the president of General Dynamics Space Systems Division. I have some appendices about the economic impact of the launch vehicle industry as well as a market study which I would like to submit for the record along with my statement.

Mr. HALL. Without objection.

Mr. WYNNE. With that, sir, with strong support from the United States Government, three commercial enterprises entered the market in the late eighties, and, in constructing a business plan of the magnitude we did, one must rely on the constancy of the marketplace and the constancy of the Government policies which support that market and allow it to function.

We find the marketplace to have reasonable constancy, although we really had a lot to learn as we diversified from a Government supplier into an international commercial competitor. With the support that we mentioned, we are working well with the Air Force at Cape Canaveral in the provision of this service, and, yes, it is not without problems, but the marketplace recognizes the risks and has been very supportive.

What I would like to do is address two Government policy issues vital to the near-term survival of the industry. I must acknowledge there are many other issues affecting our viability over the longer term.

The first issue is the policy regarding the entry of the nonmarket economy countries, China and Russia, into the commercial launch services business. In the case of both these countries, they bring a supply of capable, competitive rockets to the market but no satellite demand. We have completed a very detailed assessment of the satellite market which indicates this market is very thin.

In the performance category in which we compete, we see an average of just over 10 and one-half launch opportunities per year. With Ariane capturing about 50 percent of these, it is very easy to understand why the U.S. launch industry has been so directly concerned with the Government's policy in determining managed and disciplined entry of the nonmarkets into this marketplace. The Russians alone have an impressive space launch capability, and unless their activity is tightly constrained they have the capacity to easily dominate the entire international market.

Two weeks ago, the principles of the trade agreement were reached which were just described by Peter Allgeier, and we were very pleased that the draft agreement contained both the quantity restrictions and provisions for pricing discipline. However, Mr.

Chairman, the principles of this agreement are meaningless unless we have an unambiguous means and the will to strictly enforce this agreement.

Congress has approved legislation in the past which calls for certification by the U.S. Trade Representative that the Chinese trade agreement has not been violated prior to each satellite export license approval. I would urge that this be reconsidered and the subcommittee renew its efforts in this regard as this certification is now needed even more urgently to apply to both the Chinese and the Russian trade agreements evenhandedly.

The other issue having a near-term bearing is the international competitiveness of our industry with regards to launch vehicle technology. I live in the shadow of the Ariane 5 funded by a government consortium as well as improvements required for the Ariane 4 line, and, in the same context with the new entrants, no one really expects Long March or Proton improvements to be funded by other sources than their governments.

Frankly, the U.S. Government must invest now into the launch vehicle technologies to take the current fleet through the turn of the century. Although the larger issue of international competitiveness is in play, NASA and the military have themselves in excess of \$10 billion in payload needs forecast over this period and will benefit both from lower launch costs and the increased reliability that results.

Industry has compiled such a list identifying propulsion, avionics, ground operations, and automated data handling for their consideration. It is critical that we do this to improve our existing fleet as a bridge to the future and a hedge against our competition.

Some have asked about private investment for future launch. From experience and with the current outlook, I would not recommend in favor. Other nations have set their objectives and their national will to surpass us. We must recognize this and set policies and programs in place to restore our world leadership. Perhaps then private investment might be encouraged.

I am hopeful that Congress and the administration can work together with industry to ensure our Nation's future space will be reliable, affordable, and the best in the world. I look forward to hearing from the rest of this panel and especially the satellite panel members who are my customers, for it is they who really determine the competitiveness of my business.

Thank you very much for the opportunity to speak before you. I look forward to your questions.

[The prepared statement of Mr. Wynne follows:]

STATEMENT  
of

MICHAEL W. WYNNE

PRESIDENT  
GENERAL DYNAMICS SPACE SYSTEMS

and

CHAIRMAN  
COMMERCIAL LAUNCH SERVICES  
before the

SUBCOMMITTEE ON SPACE  
of the

COMMITTEE ON SCIENCE, SPACE AND TECHNOLOGY

U.S. HOUSE OF REPRESENTATIVES

19 MAY 1993

Good afternoon Mr. Chairman. I am Michael Wynne, President of General Dynamics Space Systems. It is a pleasure for me to be here today to discuss with you and the members of your subcommittee the important topic of the commercial competitiveness of the nation's launch industry. I think it is noteworthy that this subcommittee has shown considerable interest in the future of our launch industrial base as was demonstrated by the series of hearings which the subcommittee held earlier this year.

To address the competitiveness of the commercial launch industry, it is desirable to review the conditions under which it was begun. It was 1986, after the accident of the Space Shuttle Challenger, when the commercial launch business actually got underway. With strong encouragement from our government and supportive legislation, three U.S. companies were able to begin offering launch services to commercial customers. In order to be competitive in the international market against our European counterpart, Arianespace, substantial corporate investments were needed. General Dynamics responded with a very significant investment for improving production facilities, upgrading launch facilities and modifying launch vehicle designs to improve reliability and performance. In total, our corporate funds invested approach a billion dollars in FY1992 dollars. We believed this commercial adjunct to our government business would offer the advantage of:

- Achieving Economy of Scale
- Attracting Additional Private Investment
- Providing A More Robust Capability
- Utilizing Efficiencies of Commercial Practices

To a degree, these advantages were achieved. However, today it is fair to say that our commercial launch industry is very much in jeopardy. Let me describe the current situation as we perceive it before making some recommendations.

Our European competitor, Arianespace, is formidable. They market an equally reliable launch vehicle which is produced and operated from much newer facilities than most of those used by the United States' industry. They are owned, in large measure, by government or nationalized entities which enable them to offer favorable funding plans and other forms of business and political inducements. In the event of a failure, the costs of the analysis and correction of design flaws are covered by government funding, and they are able to bring very strong political pressures into selected competitions. In a recent Arianespace board meeting, a policy statement was approved which calls for all European satellites to be launched only on Ariane. At the same time, they compete aggressively and successfully for commercial satellites within the U.S. and have been very vocal in urging that they be allowed to compete for civil government satellite launches of both NASA and NOAA. They have an announced target of capturing 60% of the market and have demonstrated the ability to achieve that goal. Very importantly, the European Space Agency is

now developing a completely new vehicle, designed to launch payloads at a much lower cost per pound to orbit. Reports are that the Ariane V and its necessary new facilities will cost over \$6 billion with all funding coming from various European governments.

When General Dynamics made a business decision to enter into the commercial launch market, we knew that competing against Ariane would be difficult. What we did not and could not expect is that we would have to compete against Non-Market Economies (NME's), the People's Republic of China and now Russia, neither of which are inhibited by having to make a profit for their shareholders.

Let me review how the Non-Market Economy competition has developed. The Chinese pledged to cease the proliferation of weapons in exchange for an opportunity to provide launch services for U.S. satellites on their Long March vehicles. In 1988 the PRC was selling missiles to third world countries. A US/PRC trade agreement was struck allowing a limited number of such launches and containing certain other conditions, including an attempt to control price. From the beginning, the PRC has given indications that they do not take seriously the conditions of the trade agreement, particularly with respect to pricing. However, U.S. officials have not been able to agree on the most appropriate mechanism to enforce this agreement.

Subsequently, the USSR regime disintegrated and the free world applauded. In June of last year, Yeltsin pleaded to be allowed to enter the world launch market. The U.S. agreed as a one-time waiver

to the existing prohibition, to allow the launch of one satellite, but stated a trade agreement would be required before any additional launches would be allowed. Later in the year, Lockheed was given permission to seek a joint venture with the Krunichev factory to market the Russian Proton vehicle in the international market place. Iridium, a project for a network of low orbit communication satellites, is reported to be seeking three Proton launches. NASA has been studying the use of Proton for launch of interim crew rescue vehicles to the Space Station, though this could be done with a U.S. vehicle. These decisions were all taken on a case-by-case basis in the absence of an overriding national policy. Their ad-hoc policy becomes confusing as in the case of Krunichev/KBSalyet connections regarding MTCR violations, and would be better given a clear trade agreement and comparable guidelines.

The Russians have an awesome space capability and unless their activity is tightly constrained, they could easily dominate the entire international market.

We take some comfort in the principles of the latest US/Russia trade agreement that were reached and were recently disclosed to U.S. industry. We regret seeing that the Russians will have the opportunity to launch eight Western satellites from the thin market through this decade, but it is considerably better than the three per year that they had requested. Most importantly, both quantity and price constraints are included in this agreement. It appears that this administration has given some consideration to the negative effects



on our industry.

But, Mr. Chairman, these principles have little significance unless our government also has the will and a realistic mechanism to strictly enforce the terms contained in the final agreement. In the past several years Congress has approved legislation which calls for certification from the U.S. Trade Representative that the PRC trade agreement has not been violated before each satellite export licence is approved by the State Department. Such language has never been enacted into law for other reasons, but it is needed more now than ever to apply to both the Chinese and Russian agreements.

We have recently completed a rigorous analysis of the number of satellites expected to be launched through the rest of this decade for which there will be international competition for launch services. I am attaching this analysis to my statement for the record.

The bottom line is that there is an average of 10.6 such satellites per year which can be currently identified. The US/PRC trade agreement and the similar agreement being negotiated with Russia authorizes up to 25% of this number to be exported to these non-economies! Given the fact that Arianespace has been able to capture about 65% of the competitions for this category of satellites in the past, it is easy to see why I consider our U.S. commercial launch industry in serious jeopardy, and am very sensitive to the export of launches and the jobs which attend that as consideration of policy goals.

In the past, this committee has demonstrated its keen awareness of the national security and national economic value of this industry. Recognizing that the loss of the commercial portion of our launch industry and its share of our economic base will drive up the cost of government launch vehicles proportionally, is not sufficient. There is also an impact on jobs which we need to be aware of. To estimate this impact we commissioned an independent study by Dr. David Louscher of Foresight International who is well known for economic studies. He concluded that if the Chinese and Russians were to be permitted a total of three launches per year the employment loss would be 8,618 man years. This is counting direct jobs plus a conservative assumption of the indirect jobs effect.

The launch industry is only the first of a broad range of high technology industries that will be put under the same stress and face the same unpleasant future if a sustainable and enforceable U.S. policy is not put in place and followed. We must, through such policies, achieve a better balance between our domestic economic objectives and our international objectives and a better team relationship between U.S. government and U.S. industry.

For example, let's examine the potential effect on our important sister industry, the commercial communications satellite business. I am sure that industry supports a robust U.S. launch capability, but they naturally are concerned about their cost of reaching orbit. Today the U.S. is clearly the world leader in telecommunications satellites, albeit with a diminishing market share that correlates well

with the U.S. launch market share in both timing and amount. Without a competitive U.S. launch capability these satellites will become wholly dependent on foreign transportation to reach orbit. Both Russia and China are striving to improve their satellites to reach world standards. Their efforts will be assisted by any technology transfer that results from integration of U.S. satellites on their launch vehicles, through industrial intelligence means or by happenstance such as the launch failure last December which resulted in one of the latest U.S. satellites falling on the Chinese countryside. When either China or Russia are successful in developing a competitive satellite communication capability, they can then offer communication services delivered-on-orbit and our satellite industry will also be in jeopardy.

What do we need and how can the committee assist?

1. As I said earlier, we need a clear enforcement mechanism for the Chinese and Russian agreements. The only realistic way of doing this is by controlling the release of export licenses. The State Department controls export licenses. We would like to see Congress again pass language that requires the USTR to certify to State in each case that the trade agreement has not been violated before an export license is granted.
2. Every space faring nation in the world is developing new and improved launch vehicles except the United States. It is very unfortunate that we have not selected and started the

development of a new national launch vehicle which will be so important in the twenty-first century. But, our industry needs assistance today if we are even to survive until such a vehicle comes on line. A portion of the research and technology funding of NASA and DoD must be used to upgrade existing U.S. launch programs. This committee has wisely authorized this action in the past. Our industry has provided a detailed list of critical areas which could improve costs and/or reliability, and thus, our international competitiveness. We request authorizing language again and your assistance with your colleagues of the Congress in obtaining appropriations. It should be recognized that the government will recover its investment through lower costs for launch of future government satellites.

The obstacles to our commercial launch industry today in trying to compete against government-sponsored vehicles of others and the uncertainty of our own government's policies relative to China and Russia, are such that no prudent businessman would risk investing further private funds.

The United States has been the proud world leader in space for 3 1/2 decades. This came about because we had a precise objective and a national will to achieve this objective. We cannot retain this position without a robust, reliable, cost effective space transportation capability second to none. Other nations, or combination of nations have invested their energies and their will with the objective of

surpassing our position. They are now set to lengthen their lead. I look forward to the day when enlightened leadership will recognize this as the national entry into a very prestigious international competition, and set policies and programs in place to enable us to again be restored to world leadership, and yes to the day when private investment may make sense again. We stand ready to work with the government and this committee toward that end.

I await your questions.

Mr. HALL. Thank you, Mr. Wynne.

Mr. Brashears, the chair recognizes you at this time.

Mr. BRASHEARS. Mr. Chairman, with your permission, I would yield to Steve Dorfman who has a very tight airplane schedule, and—with your permission, sir.

Mr. HALL. Well, he is the president and CEO. I guess we will all yield to him.

I recognize you at this time.

Mr. DORFMAN. Thank you, Mr. Brashears, and I notice the sensitivity of the launch vehicle industry to their customers. I like that.

[Laughter.]

Mr. BRASHEARS. We have an order blank outside.

Mr. HALL. If we could all get along so well up here.

Mr. DORFMAN. And I thank you for giving me this time preference.

For those of you that don't know, Space and Communications is located in El Segundo, California. We have 6,000 employees that are in principally Ms. Harman and Mr. Rohrabacher's district, so I feel I have a sympathetic audience here today, and our business is heavily dependent upon the exporting of satellites. About a third of our business is exports, and over the years we have exported 75 satellites worth about \$5 billion of export; we are very proud of that, and we are a very interested party in these discussions, obviously.

I want to endorse Pete Teets' comments. I strongly believe that we should have an investment program in the U.S. launch vehicle industry in which the Government program will be the major beneficiary. I disagree with Mr. Hall's statement earlier that that needs to be a \$12 billion-10-program. I think that approach is inevitably going to lead to a mediocre outcome. I think it could be done for half the price and half the time if we had the will, and that is another subject, but I really feel that this country should be investing in the U.S. launch vehicle industry and justify that investment on Government programs with the commercial competitiveness in the international market being a corollary to that investment.

I agree with the concept of a protection in the interim as the Chinese and the Russians enter the world market, so I endorse the ideas of quotas. From my perspective, Russia and China are two different cases entirely. Russia is purely a seller in today's world marketplace, and they want to sell launch vehicles into the world market, they are not buying anything.

So from my view, China is a completely different situation. They want to sell, but they also want to buy. They have hard currency, and they are buying satellites from Hughes. We have already sold them two, and there's options for more, and I intend to sell them some more satellites. So I feel that our policy needs to be balanced, not oriented strictly to protectionism for the launch vehicle industry but be balanced to take into account that we have a major market in China.

I happen to believe that the aspect of the policy described earlier by Mr. Allgeier has a major fault. I think he knows that. I think a quota without a pricing provision is the proper way to proceed. I think at a 7.5 percent differential it is unlikely that people will

buy Russian launches. I don't really care that much about that, but if the same provision was on Chinese launches I would care about that.

So that is kind of a summary of where I come from.

Pardon? Because the Chinese are customers and the Russians are selling. I mean it is that simple. This is not an ideological point, this is a pragmatic business point. The Chinese are a major customer of Hughes satellites, they are a major customer of Martin satellites, and I think, first of all, all these agreements should have a strong bilateral component to it, and I suggest that be in the Russian deal, but I think, practically speaking, the Russians are not going to be buying satellites or launches from the United States for the—through the year 2000, whereas the Chinese are already buying satellites from the U.S.

My concern about the 7.5 percent is a very practical one. I think it is constraining on the seller of launch vehicles. In fact, I doubt if anybody is going to buy any Russian launch vehicles with that differential. If that is imposed upon the Chinese, I think we will have the same situation.

[The prepared statement of Mr. Dorfman follows:]

**INTERNATIONAL COMPETITION IN LAUNCH SERVICES**

**Steven D. Dorfman**  
**President and CEO**  
**Hughes Space & Communications Company**

**May 19, 1993**



## INTERNATIONAL COMPETITION IN LAUNCH SERVICES

Approximately three months ago, I testified before this committee and advocated the need for quick and decisive action in building a new National Launch System (NLS), whether it be called the Spacelifter, the NLS, or something else. At that time, I was testifying as the Chairman of the Department of Transportation's Commercial Space Transportation Advisory Committee (COMSTAC). The testimony I then gave is attached to this statement.

Today, I am here as the President and CEO of the Hughes Space and Communications Company. My message today is much the same: that the US needs a NLS if it is to remain a world leader in launching commercial satellites. The NLS is needed if the US is to be competitive - truly competitive - in the commercial launch market.

The competitive posture of our current US launch vehicles is increasingly in jeopardy. The launch vehicle's competitive posture is, in part, maintained by quotas negotiated by the US Government with foreign competitors. The negotiated quotas include nine launches over a six-year period on Chinese Long March vehicles for US-manufactured spacecraft and soon-to-be announced quota for Russian launchers. It is this negotiated "competitiveness" that I wish to address today as a means of reinforcing my previous testimony.

The Commercial Launch Services Memorandum of Agreement, agreed to in 1988 and consummated between the US and China in January 1989, allowed for nine Long March launches of US-manufactured spacecraft through January 1994. To date, only three US-manufactured commercial communication satellites have been launched by Chinese Long March vehicles. Though the three satellites were manufactured by Hughes, the Long March was chosen not by us but by our customers. It is our understanding that the customers' desire to position themselves to take advantage of and gain a foothold in the burgeoning Chinese market were their prime reasons for selecting Long March over the Ariane, Atlas Centaur, or the Delta. Thus, the price associated with Long March does not seem to have had a major bearing on their selection of the vehicle.

Nonetheless, there have been repeated expressions of concern relative to tech transfer and allegations of predatory pricing, especially from the US launch vehicle industry, each time that a Hughes satellite has been proposed for launch on a Chinese vehicle. We do not fully understand this concern. No technology transfer is involved; no security is compromised; and the threat of the Long March to the US launch vehicle industry is, in our opinion, much less than the competitive threat posed by the Ariane family of launch vehicles.

From our perspective the greater risk to the US, and Hughes, is losing the significant potential represented by the Chinese market. We are talking about more than just lost opportunities. We are talking about jobs. We are talking about jobs in an area devastated by unemployment. We are talking about the risk of giving foreign competitors a foothold in a highly competitive market segment where the US, and Hughes, leads the world.

The Hughes Space and Communications Company is located in El Segundo, California. We draw upon pools of talent from the five county Los Angeles metropolitan area. This is the same area that has suffered 27 percent of the total US job losses between June 1990 and December 1992. Given the multiplier effect, we estimate that the sale of just one commercial communications satellite leads to direct and indirect employment of approximately 1,000 people.

Consequently, our sales to China have to be a front burner issue. China is in the early stages of its development cycle. It has set ambitious goals for its modernization, especially in the telecommunications area. These goals have been buttressed by real accomplishment and real dollars. In 1970, China's total foreign trade was \$4.6 billion. By 1978, China's foreign trade had increased to \$20.6 billion; and by 1988, it was \$102.8 billion. Japan and Europe significantly led the US as China's major trading partners. Last year, 1992, China did approximately \$165.5 billion abroad. It exported \$25.7 billion in products to the US, and imported only \$7.5 billion. This growth is expected to continue over the next twenty years even more dramatically than the previous two decades.

We, at Hughes, have had a long interaction with the Chinese. They are on contract to buy one of our satellites, with options to buy more. They want to buy US, but they also are being marketed heavily by several, well qualified non-US sources, who are not subject to the same constraints that we are. The non-US sources, primarily European companies, are struggling for survival and eager to make inroads into a market now dominated by Hughes, Loral, and Martin Marietta.

We are sympathetic to the needs of the US launch vehicle industry, but if their actions have the impact of denying us the export licenses necessary to sell our commercial communications satellites abroad, the consequences could be tragic. Denying export licenses will not prevent similar satellites from reaching potential customers, such as the Chinese. Denying export licenses will not increase the competitiveness of our launch vehicles. Denying export licenses will only shift jobs and sales that we badly need in the US to Europe, Canada, or Japan. The loss of these jobs and sales may deny us revenues in the billions of dollars, and compound further our balance of payments and deficit problem.

US launch vehicle industry representatives previously have expressed the need for a "rules of the road" trade agreement restricting European, Chinese, and now, Russian launches. They have hinted that legislative action may be necessary to give teeth to their proposals. In my opinion, the results of these actions would be unfortunate. By diverting attention from the real problem, our national need to modernize an aging launch vehicle fleet and build a NLS, the actions could act to erode further the competitive posture of the US launch vehicle industry. Moreover, it also could cause us to lose our competitive edge in commercial communications satellites and lead to job losses considerably greater in number than that which could be salvaged for the US launch vehicle industry.

Consequently, I am strongly of the opinion that the satellite communications industry must play an integral role in the framing of a national launch policy. The satellite communications industry is much larger, almost 10 times larger, than the launch vehicle industry. It brings to our economy considerable foreign revenues. Although foreign competition is increasingly growing,

the US satellite communications industry remains as a symbol of national pride and US technical prowess. The Hughes Space and Communications Company, itself, has exported over 75 commercial communications satellites that, adjusted for today's dollars, have pumped approximately \$5.0 billion back into our economy. Consequently, I am opposed to protectionist measures that could damage the competitiveness of the US satellite industry, and my company and its employees.

As I stated on 17 February and on many other occasions, we need a national program to revitalize the US launch industry. We, at Hughes, are very supportive of US Government sponsorship of a National Launch System and a national launch capability that will evolve into and through much of the next century. Our nation needs a strong, competitive launch industry. We believe that by quickly and decisively addressing the problem, and not the symptoms, the US can recapture much of the ground lost to foreign launch companies over the last decade.

As a corollary, however, we request the assistance of our elected representatives in ensuring that the leading position currently enjoyed by US spacecraft manufacturers not be eroded as our representatives address the needs of the launch vehicle industry. We spacecraft manufacturers have a competitive edge and we wish to keep it. Without your enlightened perspective, understanding and support, the spacecraft manufacturers may, too, be placed in jeopardy.

**COMMENTS ON  
THE FUTURE OF THE U.S. SPACE LAUNCH CAPABILITY**

**Steven D. Dorfman  
President & CEO  
Hughes Space & Communications Company**

**Chairman  
Commercial Space Transportation Advisory Committee  
Department of Transportation**

**February 17, 1993**

**COMMENTS ON  
THE FUTURE OF THE U.S. SPACE LAUNCH CAPABILITY**

I am here as Chairman of the Department of Transportation's Commercial Space Transportation Advisory Committee (COMSTAC). COMSTAC is composed of executives from the launch and satellite industry, as well as other interested parties from the financial and insurance community and is responsible for advising the Secretary of Transportation on commercial launch vehicle policy. I am also President of the Hughes Space & Communications Company (HSC), a unit of General Motors Hughes Electronics (GMHE). In both roles, I am interested in a strong worldwide commercial launch vehicle industry. My company, HSC, is the major provider of commercial satellites worldwide and our business is very dependent upon available, reliable, and affordable launch vehicles. The cost of a communication satellite in orbit is about half satellite cost and half launch vehicle cost. Insurance costs add an additional 15-20% depending upon the reliability of the launch vehicle. Communications is an elastic marketplace. That means the lower the cost of the launch vehicle, the more satellite communications we sell -- and vice versa.

Our customers buy satellites from us in one of two ways: delivered in orbit with the satellite provider responsible for launching and insuring or they buy the satellite, launch and insurance separately. Hughes has purchased launch services on Ariane, Atlas, Delta, Long March, and Titan, virtually all commercial Expendable Launch Vehicles (ELV's) currently available. In the next two years, we will be launching a satellite about once per month.

The principle reasons for developing a new National Launch System include 1) developing a new heavy-lift capability that will enable new missions such as

SDI and SEI; 2) substantially reducing cost and improving reliability of launches and thereby justifying the investment of new launch capability by normal criteria of return on investment; or 3) increasing the international competitiveness of the U.S. launch vehicle industry.

I will speak only to the third category this morning and my comments are based upon National Space Policy Directive No. 4, which dictates that the National Space Launch Strategy should actively consider commercial space launch needs.

Today's ELV industry is dominated by the European Arianespace company. Arianespace is owned by a total of 52 European aerospace companies, banks, and national agencies. Ownership nationality is approximately 57% French, 18% German, and the rest spread around nine countries. The French ownership is principally government controlled agencies such as CNES. The Ariane rocket is the only ELV in use that was designed specifically for launching satellites. It went into service about 12 years and has been upgraded to today's Ariane 4 configuration. Arianespace currently has about 60% of the competitive world's market for commercial launches. The remainder is effectively divided between the General Dynamics' Atlas and the McDonnell-Douglas' Delta. The China Great Wall Industry Corporation (CGWIC) Long March ELV has recently entered the market but so far has accounted for only three satellite launches in four years. The Russian Proton is also attempting to enter and has received one order. Both China and Russia are offering relatively low prices for their services. The Martin Titan ELV has had two commercial satellite launches but currently is not competing in the commercial market.

The U.S. commercial ELV providers, Atlas, McDonnell Douglas, and Martin ELV's are based upon 30-40 year-old missile technology upgraded for current

use. They compete against an Ariane optimized for satellite launch and supported by major investments by the European Space Agency (ESA). The U.S. companies have experienced financial troubles including a \$300M write down by General Dynamics on commercial Atlas and a \$90M write down by Martin on commercial Titan. After initial startup problems, Ariane's quality performance has been good, with a current string of 19 straight successes. Arianespace also offers a broad range of launch capability and competitive prices. In 12 years, they have gone from zero market share to 60% market share and their market share continues to increase.

The ESA is in the process of developing the next generation of Ariane called Ariane 5. This brand new ELV development includes, in addition to a new cryogenic engine and new solid rocket motors, extensive new infrastructure at Korou, French Guiana. The new rocket and infrastructure has the advertised objective of reducing launch costs by 20 to 40%. ESA is investing over \$5B in this project. The first launch is scheduled for 1995 and the system is to be commercially operational in 1996. At this time, Ariane will have strengthened its already dominant position as the world's leading provider of commercial launches.

ESA is not the only agency developing a new ELV. NASDA of Japan is also developing a brand new rocket, the H-2. This ELV will enter service in 1995. The Japanese have formed a company for selling commercial ELV services but have not yet entered the marketplace. It is not clear how competitive H-2 prices will be but the Japanese have proven very price competitive in other areas.

With Arianespace consolidating its leadership role, with Japan developing a new ELV, and with Russia and China aggressively marketing their ELV's, the future for the U.S. commercial launch vehicle industry will be very challenging.

Today's projection of commercial satellite launch vehicle requirements indicate that most, if not all, commercial communication satellites needs could be met by a 20,000 pound low earth orbit ELV. The larger NLS payloads are of little interest for commercial interests. Therefore, the suggestion of the Space Policy Board to focus on the 20,000 pound class core stage seems very attractive from the commercial marketplace standpoint. Focusing first on the development of a 20,000 pound ELV and then building upon that core capability in subsequent upgrades when greater lift weight might be required would produce the quickest and least costly initial development.

Because of our belief that the commercial marketplace will be an important factor in the development of the new national launch capability, I suggest that the commercial sector -- launch vehicle and satellite -- be included in the process of detailed definition of the requirements of the new capability. A principal development goal of the new ELV must be significantly reduced cost and increased reliability. An ELV that would halve the launch costs of today's ELV's would be very competitive with Ariane 5 and would substantially increase competitiveness of the U.S. ELV industry.

We often talk of the competitiveness of the U.S. space program compared with Europe, Japan, Russia, and China. Most of the time, this is a subjective judgment of the relative quality of our manned space exploration and space science programs. However, the competitiveness of the commercial part of our space program, communication satellites and launch vehicles can be specifically measured by market share and profitability. As another example, international commercial airplane sales are a measure of the competitiveness of our aeronautics industry. These markets are international in nature and measure the strength of our technology versus other nations. Our success is measured by strong industries, exports, national prestige, good trade



balance, and jobs. Today, the U.S. has 70% market share in commercial airplanes, 70% in commercial satellites, and 35% in commercial launch vehicles. The NLS will improve the U.S. ELV market share as well as reduce the cost of U.S. Government launches. However, to achieve this objective, we must move quickly and decisively -- we have vacillated and procrastinated far too long. It's time to get our act together or accept the fact that the U.S. will not be the world leader in launching commercial satellites.

Ms. HARMAN [presiding]. Does that conclude your testimony?

Mr. DORFMAN. Yes, Ms. Harman—Ms. Chairman.

Ms. HARMAN. Thank you very much, Mr. Dorfman. Go catch your airplane. I think—if you can stay, I think the plan is to proceed with the panel and then ask questions of everyone, so that—

Mr. DORFMAN. Yes. I thank you for yielding. I can actually stay until about 4:30.

Ms. HARMAN. All right. Well, then, I think Mr. Rohrabacher can pursue his line of questioning a bit later.

Mr. Brashears is next.

Mr. BRASHEARS. Okay. Thank you very much.

We find ourselves largely in agreement with what not only was said at the start by the Members but also what has been said here to date, and what I would like to do in our short remarks—and I ask that my summary testimony, the detailed testimony, and our marketing analysis be submitted for the record also.

Ms. HARMAN. Without objection.

Mr. BRASHEARS. My associate has two boards that I would like to call the committee's attention to that quantifies what the members said in the opening remarks. We find ourselves in 1993 where, since 1980 when the U.S. launch industry enjoyed a 100 percent market share, with a declining market share of approximately 8 percent per year, if you average that out, and the white line is that trend. We find ourselves in 1993—in fact, Arianespace announced last week 15 contracts are likely to be signed in 1993, thereby increasing that near monopoly.

We are a user of launch vehicles. Our predominant business at the Space Systems Division is the building of defense and national security satellites. With declining defense budgets, we are looking to apply our core competencies and our skills in commercial applications, and Motorola's Iridium program is a perfect example of that. That program, by itself, as it is unveiled here in the next 60 days, will create over 5,000 U.S. jobs. It would not be possible without an international launch vehicle mixture embedded within that consortium financing. So the subject of today is very important in making sure that this economic explosion, if you will, of space commerce is possible.

The USTR agreement is a very good start, in our opinion. It recognizes the difference between a very stable GEO-COMSAT market and a new emerging LEO market. So what we might agree on is that, if we are successful in creating economic growth in space commerce as a by-product of this, that even the U.S. launch industry, which finds itself at this monopolistic disadvantage, might also be benefited by there being more application in space commerce.

This market, by the way, is about a \$500 million-a-year market, and the chairman commented on that in his opening remarks.

On the next board you will see the flip side, which is moving from the launcher over to the satellite application, ground segment and operations of the system. This is 91 percent of that \$5 billion space commerce.

While we do need some balance, because this country needs a U.S. launch capability on U.S. soil, we should recognize this ten-to-one lever in the space commerce as it exists today, but, more importantly, if there is the explosion that we believe is possible in the

application of commercial space, what we need is favorable regulation, policy, and legislation to support that. We at Lockheed believe in that. We are investing our own money without subsidy in trying to capture this vision.

Note the trend line in white on the satellite side of the business. We are holding our own in this country in that we have about a 50 percent market share. Ironically, we have the world leadership in satellite technology, so we are well postured to take advantage of this. What we need are these transition rules of the road, annual revisits of that, and there is a three-and-a-half year provision for a complete review of that, and as the partnership of Lockheed, Khrunichev, and Energia takes place we hope to be back bumping up against that cap because then we will all be successful in the commercialization of space.

Thank you.

[The prepared statement of Mr. Brashears follows:]

## BACKGROUND

The U.S. Commercial Space Launch industry has lost market share. Since 1981, the U.S. share of this market has eroded from 100% to less than 40% in 1992.

This situation exists for many reasons, not the least of which is cost. The U.S. commercial space launch industry finds itself at a price and reliability disadvantage relative to non-U.S. space launchers, the most prominent being Arianespace. In terms of dollars per pound to geosynchronous orbit, foreign boosters are less than one-half the price of U.S. space launchers.

A similar situation is evolving in the communication satellite market. Since 1974, the U.S. portion of the communication satellite market has eroded from 100% to about 70%. The U.S. Government policy of no U.S. satellites on Russian launchers places a cost burden on U.S. satellite manufacturers not experienced by foreign manufacturers. The U.S. geosynchronous communication satellite market is mature and is basically a replacement market. Market growth is expected in the non-U.S. market. Continuing to require U.S. satellite manufacturers to use non-Russian launchers places U.S. firms at a competitive disadvantage relative to foreign producers. In fact, continuation of this policy will most likely attract non-U.S. firms into the market.

Fifty percent of the geosynchronous locations licensed are presently filled. Non-U.S. locations remain unfilled mainly due to financing. A decrease in the cost to space will lead to an increase in filling some of these slots. A conservative estimate is that nine new satellites would be launched if the price of the launcher were reduced 30%.

The creation of jobs in this case far exceeds just the launch industry. Many more jobs will be created in the satellite, ground equipment, and service industries. In fact the reduction in market launch costs of \$300M will result in an increase in the total industry of \$1.5B, a leverage of at least 5 to 1 potentially increasing to 10 to 1 in a growing commercial space market.

Proton would stimulate this growth in the commercial satellite industry. Lower cost boosters would spur more satellite builds for demand not being met today. Current combined costs (spacecraft and launcher) are investment hurdles for many investors. The production of more satellites would create job and revenue growth in satellite services and earth stations, a high revenue producing portion of the space market.

The U.S. Government should provide a strong commitment to commercial space commerce. To do so would create a more level playing field for U.S. satellite manufacturers compared to foreign producers. To ease initial concerns, the U.S. Government could impose quotas and floor pricing constraints on non-U.S. launchers during the period their economies transition to free markets.

If the U.S. maintains its policy of not allowing U.S. satellites on Russian boosters while insisting on compliance to the MTCR--a no-win situation for Russia will continue. Their government and industries will be forced to find other partners who may not have U.S. interests at heart. Russia desperately seeks cash, jobs and world respect as they transition to a market economy. LKEI, acting in consonance with U.S. global objectives, represents a positive alternative to unstable Third World countries who seek Russia's skilled labor, technology and equipment. The U.S. cannot expect Russia to support MTCR when America hedges on removing restrictive barriers to commerce.

Mr. Chairman and Members of the Committee:

Thank you for this opportunity to appear before your Committee to discuss the international launch vehicle market. I am Mel Brashears, Vice President and Assistant General Manager of Lockheed Missiles and Space Company's Space Systems Division. In addition, I serve as Vice President of Lockheed Commercial Space Company and President of Lockheed-Khrunichev-Energia International.

Today, I will discuss some of the challenges and opportunities facing this critical sector of the aerospace industry.

First let me provide you with some background on Lockheed Missiles and Space Company and our Space Systems Division.

Lockheed's Space Systems Division has a long and successful history as a satellite manufacturer and launch services provider. As a pioneer in U.S. space, it has been more than 30 years since the Lockheed-built Agena was first launched. That mission was only a prelude to the success which would follow. In the decades since, Lockheed's Space Systems Division has built and launched more than 350 satellites.

Today, Lockheed is one of the world's premiere aerospace and defense companies.

Our achievements in the industry, including helping our nation to bring about an end to the Cold War, are a great source of pride for my colleagues and me at Lockheed. These national accomplishments have helped to usher in a new era. We have prevailed in the Cold War and, as a nation, we should all take pride in that achievement.

While such accomplishments have helped to lessen the threat of a nuclear holocaust, immediate challenges for the aerospace community and the entire nation have resulted.

Just as the nation finds itself at economic crossroads, to a larger degree, so does the U.S. aerospace industry.

We in the U.S. aerospace industry have collectively arrived at a point of departure from the past. The juncture we find ourselves demands that we examine where we will find economic opportunities in the future. To answer this question, we will almost certainly have to reexamine our role in the global economy.

This question and its answers are as vital and pivotal to our nation as they are to the U.S. aerospace industry.

To the credit of our government and industry, the Cold War has produced a tremendous technological base of capability and talent. We have a unique and

unprecedented opportunity to use that pent-up capability to help us chart a new course for America's global economic growth.

The Administration's thrust of capitalizing on dual use technologies and encouragement of international partnerships and cooperation (to meet global challenges and as a stimulus for economic growth) form a perfect base for this departure.

President Clinton and Vice President Gore recently proposed a technology plan which notes that a new set of criteria must be applied when measuring the strength of civilian technology policy if the U.S. is to succeed in the global marketplace. This plan calls specifically for technology policies that encourage U.S. access to foreign science and technology, enhance cooperation on global problems and facilitate U.S. successes in technology-related foreign markets.

From an economic standpoint, this is a very logical path that will allow U.S. industry to become the leader in the new growth markets of the 21st century.

We believe strongly that commercial space is one of those growth markets. Simply put, the space frontier holds the key to a whole range of commercial opportunities which can add to our nation's economic prosperity.

We, at Lockheed, are actively pursuing projects which exemplify this belief. In Motorola's IRIDIUM<sup>TM/SM</sup> project, we are using expertise gained from our manufacture of satellites for the Department of Defense and NASA to develop a global telecommunications satellite network, which promises to revolutionize that industry.

Our new venture, Lockheed-Khrunichev-Energia International (LKEI), involves a long-term partnership with two of Russia's premier aerospace companies. This partnership calls for providing one of the world's most reliable and cost efficient rockets. LKEI's number one aim is to provide efficient and reliable space transportation. We believe this will help to foster and facilitate a whole range of new commercial space ventures for the United States satellite manufacturers.

Despite our optimism on the potential of the commercial space market, this market and the opportunities that lie within it are constrained by two prime factors which I mentioned a moment ago -- the cost and reliability of space launch.

Clearly, from an economic standpoint, for the U.S. to capture the commercial space market we must address the cost and operational efficiencies associated with launch.

We must also stabilize and ultimately strengthen our position as the worldwide leader in the satellite manufacturing market. While the U.S. is still the

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\* IRIDIUM is a registered trademark and servicemark for Motorola, Inc.

leader in this market, history indicates we should take little comfort or security from this lead.

It was only a few years ago that the U.S. held the lead in the commercial space launch sector. As recently as 1981, the U.S. held 100 percent of this entire market. During the past 12 years, the U.S. lead has plunged from market dominance to little more than a small market presence. We have reached the point today where over two-thirds of that market is now dominated by non-U.S. suppliers. In fact, since 1986 three-fourths of all commercial launches, including U.S. satellites, have been on non-U.S. launch vehicles.

We are presently witnessing the same trends in the satellite manufacturing industry, particularly communications satellites, which we experienced in the commercial launch market in the 1980s -- namely an erosion of our market share.

Current policies, which prohibit launch of U.S. satellites on Russian launchers, prevent many U.S. aerospace companies from capitalizing on our technological and market share lead in space. These policies were appropriate when the U.S. was engaged in a bilateral Cold War. Those days are behind us, we trust, and we are now left with an incongruent set of policies and procedures.

The question our government must ask is who will be served if these policies are left unchanged. We have watched the U.S.'s commercial launch market share dwindle in a matter of years, despite policies that prohibit U.S. satellites from launch on Russian rockets. Now we are seeing the threat of those policies to the satellite manufacturing market.

We need changes now to allow dual use technology to be applied to growth markets. If these policy changes are not made, 10 years from now U.S. satellite manufacturers may find themselves minority stakeholders in this market.

For the sake of discussion, let's look at this situation from the Russian point of view. We in the U.S. have asked Russia not to proliferate its missile technology. We have also told the Russians that they cannot sell to non-signatories of the so called MTCR or Missile Technology Control Regime. At the same time, we have policies on the books that prohibit U.S. companies from buying their products. Imagine the confusion of Russian business leaders as they try to understand how we can take both sides of the same issue.

As President Clinton and many members of our Congress have said, the most stabilizing defense for the future is to form partnerships with Russian businesses -- international partnerships which are facilitated by favorable policies and procedures within the U.S. Government. These partnerships will become the deterrent mechanisms for the world of tomorrow.

In fact, partnerships such as LKEI, serve as a stimulus and an incentive for Russian businesses to comply with the MTCR.

Now that I have described some of the policy and economic issues confronting the international launch vehicle market, let me provide you with a little more detail about what the LKEI partnership is and what it isn't. The LKEI venture is aimed at merging the unique capabilities, cost efficiencies and supreme reliability of the Proton launch vehicle with the vast satellite manufacturing and payload integration capability of Lockheed.

The Proton booster is a quality product. Before Lockheed entered into this venture, we analyzed a host of different launchers -- both U.S. and non-U.S. We concluded beyond question that the Proton rocket provided the necessary quality at a reasonable value.

I want to emphasize that we are not after capturing existing inventory and dumping it onto the world market. We have sought a long-term partnership. We believe that partnership will create a vital business which benefits both the U.S. and Russian economies.

There is no question that the entrance of the Proton booster into the worldwide commercial launch market will stimulate competition. However, we believe through partnerships such as LKEI, competition will benefit the U.S. aerospace industry and ultimately help to level a playing field that is currently dominated by non-U.S. entities.

In summary, we must have coherent policies that reflect current economic and geopolitical realities that balance the interests of launch providers and satellite manufacturers and that serve our national and foreign policy interests.

Russia desperately seeks a role in the world's market economy. Partnerships, such as LKEI, are vital to their transition to democracy. We have spent untold sums fighting communism in our drive to achieve peace and stability throughout the world. Now we must invest our time and energy in developing policies that will help to foster and maintain that stability through economic partnerships.

Mr. Chairman and members of the Committee, thank you for inviting me to speak with you today on these critical issues. I welcome your questions.



**LOCKHEED-KHRUNICHEV-ENERGIA INTERNATIONAL VENTURE****Background**

Lockheed Commercial Space Company, Inc., a wholly-owned subsidiary of Lockheed Missiles & Space Company, Inc., has established a commercial relationship with Khrunichev and Energia, the Russian manufacturers of Proton space launch vehicles.

The new company, Lockheed-Khrunichev-Energia International (LKEI), provides Proton launch services to worldwide commercial satellite markets from launch facilities at Baikonur Cosmodrome in Kazakhstan. Lockheed will have full access to the launch facilities for payload integration and payload security. Lockheed will also provide payload transportation to Baikonur, and provide export license administrative support. This arrangement ensures there will be no transfer of the Proton vehicle to third parties and that technology will remain in control of U.S. interests.

The initial framework for LKEI was agreed upon 30 October 1992, finalized on 23 January 1993, and includes: (1) Agreement to address the policy concerns of both governments; and (2) Establishment of the new company.

Lockheed has a long and successful space history. For more than 28 years, the Lockheed-built Agena served as the workhorse of the space industry, carrying a wide variety of payloads on more kinds of boosters than any other spacecraft in history. Lockheed's pre-eminence in space reflects the company's will and know-how to invent approaches that became the templates for Aerospace success the world over.

On the launch side of the business, a similar history of excellence exists at Khrunichev and Energia in Russia. Their Proton booster has achieved over 200 launches since 1965--proven experience in a system that is affordable, reliable and available.

These accomplishments are representative of the tremendous technical base of skills and capability that exist in American and Russian aerospace today. As the U.S. revitalizes its economy while Russia grapples with reforms, an unprecedented opportunity exists to transfer much of this talent into civil and commercial markets to accelerate economic growth and advance social enlightenment. LKEI is an enabling mechanism to do just that.

### **U.S. Space Industry is Threatened by Foreign Competition**

U.S. commercial satellites currently still dominate world markets, discouraging heavy investment by international competitors. Commercial satellites and their related industries create more than \$5B in annual revenues generated by the work of over 50,000 U.S. workers. While the U.S. is still number one in this market, history indicates that little comfort or security can be expected from this lead.

On the other hand, U.S. commercial launcher market share has eroded from 100 percent in 1981 to less than 40 percent in 1992. The U.S. commercial space launch industry finds itself at a price and reliability disadvantage relative to foreign space launchers. In terms of dollars per pound to geosynchronous orbit, foreign space launchers are less than one-half the price of U.S. space launchers.

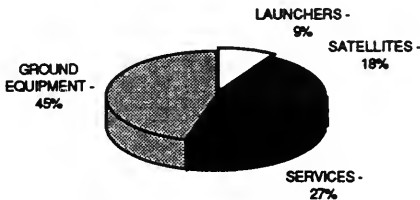
A similar situation is evolving in the communication satellite market. Since 1974, the U.S. portion of the communication satellite market has eroded from 100 percent to

about 70 percent in 1992. In fact, since 1986, the U.S. has averaged only a 55 percent market share. The Government's policy of no U.S. satellites on Russian launchers creates a cost burden on U.S. satellite manufacturers not experienced by foreign manufacturers, placing U.S. firms at a competitive disadvantage.

Continuance of this policy will likely encourage other governments to increase the subsidy of their companies' entry into the space market to develop their national technology base and to enhance their national prestige. As the Economist noted, this is injurious to U.S. interests. "Space is one area where American protectionism will be welcomed by Western Europe as a means of safeguarding Arianespace's share of the market."<sup>1</sup> Immediate world competition is the only known solution to this problem.

#### **LKEI Will Benefit the U.S. Space Industry**

Left unchecked, new foreign boosters will erode further the \$1B launcher market, and ultimately, because of U.S. technology transfer policy, place in jeopardy U.S. dominance in the much larger \$10B satellite, services and ground equipment market.



Source: Space Business Indicators,  
Department of Commerce, 1992

<sup>1</sup>Economist, "Reverse Thrust," February 20, 1993, p. 62-64.

Over the last 30 years, 103 out of 208 commercial satellites were built by U.S. companies for foreign owners who are now opting for lower cost foreign launchers. The concern is that other nations will build their own satellites for flight on foreign boosters, putting American jobs and revenue at further risk. Use of lower cost boosters like Proton would stimulate growth in the U.S. commercial satellite industry by spurring more satellite acquisitions. A considerable portion of today's market demand is not being met because the combined costs (spacecraft and launcher) are investment hurdles for many investors. The production of more satellites would create job and revenue growth in the lucrative satellite services and earth station markets.

#### **LKEI Will Facilitate Defense Conversion to Commercial Business**

The Lockheed-Khrunichev-Energia venture will demonstrate that defense companies from both the U.S. and Former Soviet Union can convert their knowledge and capabilities to peaceful purposes without government investment. The LKEI enterprise embraces the tenants of President Clinton's new Technology Initiative by accelerating the development of U.S. access to foreign science and technology.<sup>2</sup>

LKEI offers an in-country employment opportunity for Russian engineers and scientists who today are eagerly being sought by Third World countries.

#### **LKEI Will Facilitate U.S. Objectives Under MTCR**

Through the joint venture, Lockheed will manage the worldwide sales of Proton and its launch services, helping ensure adherence to the letter and spirit of the Missile

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<sup>2</sup>President William J. Clinton, "Technology for America's Economic Growth, A New Direction to Build Economic Strength," February 22, 1993, p. 2-3.

Technology Control Regime (MTCR). Lockheed's participation precludes non-MTCR compliant nations from acquiring Proton services and technologies.

The LKEI agreement complies with the MTCR. According to Frank Wisner, Deputy Undersecretary of Defense for Policy, "I could find no grounds to say to the Secretary of State, and neither could he to the President, George Bush of the day, that any arms, any munitions control feature is violated by that Lockheed agreement."<sup>3</sup> In fact, proactive language to this effect is contained in the signed LKEI agreement.

Selling Proton through LKEI denies Russia the opportunity to partner with other nations, effectively controlling missile proliferation. Khrunichev's and Energia's good faith adherence to the MTCR is evidenced in their denying sales to Iran, Iraq, Kuwait and Taiwan. Just as critical is preventing the transfer of U.S. technology and know-how. LKEI is structured to deny Russian access to U.S. satellite technology. Only Lockheed, through its payload integration services agreement, can access customer satellites and their integration to the Proton launcher.

Even though the U.S. Government has not reached a bilateral MTCR agreement with the Russian government at this time, LKEI enables the U.S., through commercial contracts, to bind Russian industries. This enhances world stability at a time of great internal debate within the Former Soviet Union as to what kinds of reforms should be pursued. LKEI can serve as a powerful mechanism to help Russia become a responsible member of the global economy, the type of effort supported by President Clinton. At a recent news conference with French President Mitterrand, Clinton said it is "important for us to try to move aggressively to give the Russians the means to

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<sup>3</sup>Senate Armed Services Committee Hearing. The nomination of Frank Wisner to be Undersecretary of Defense for Policy, March 4, 1993.

restore some economic growth and opportunity and preserve political liberty."<sup>4</sup> The incentives that will accrue to Russia from the LKEI agreement will contribute towards this endeavor and should help convince Russia to formally comply with the MTCR.

Yet this opportunity may be lost if the U.S. maintains its policy of no U.S. satellites on Russian boosters while insisting on Russian MTCR compliance—a no-win situation for Russia. The Republic desperately seeks cash, jobs and world respect as they transition to a market economy. LKEI, acting in consonance with U.S. global objectives, is a positive alternative to unstable Third World countries who seek Russia's skilled labor, technology and equipment. The U.S. cannot expect Russia to support MTCR while America keeps restrictive barriers to commerce in place.

### **Recommended Government Role**

Specific actions are needed on the following areas:

#### **A. Transitional**

1. Set interim quotas for geostationary orbits
2. Allow the low earth orbit market to grow unconstrained in a free market economy with no quotas
3. Set floor pricing constraints for both markets
4. Remove satellites from the munitions list

#### **B. Full Market Economy**

1. No quotas, no floor pricing
2. Provide a strong commitment to international space commerce regulatory change by removing restrictive review and licensing barriers

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<sup>4</sup>Washington Post, "Clinton Urges Group of 7 to Move on Russian Aid," March 10, 1993.

**Summary**

Russia is in a no-win situation today as the U.S. insists on compliance with the MTCR while hedges on removing restrictive barriers to commerce. This needs to change immediately or else Russia's need for cash, jobs and world respect will force them to find other partners for Russian technology, equipment and skills--partners who are unlikely to have U.S. interests at heart.

LKEI's agreement is reasonable and in consonance with U.S. global objectives.

# **COMMERCIAL SPACE MARKET ANALYSIS**

**(WHY LOWER LAUNCH COSTS BENEFIT THE ENTIRE MARKET)**

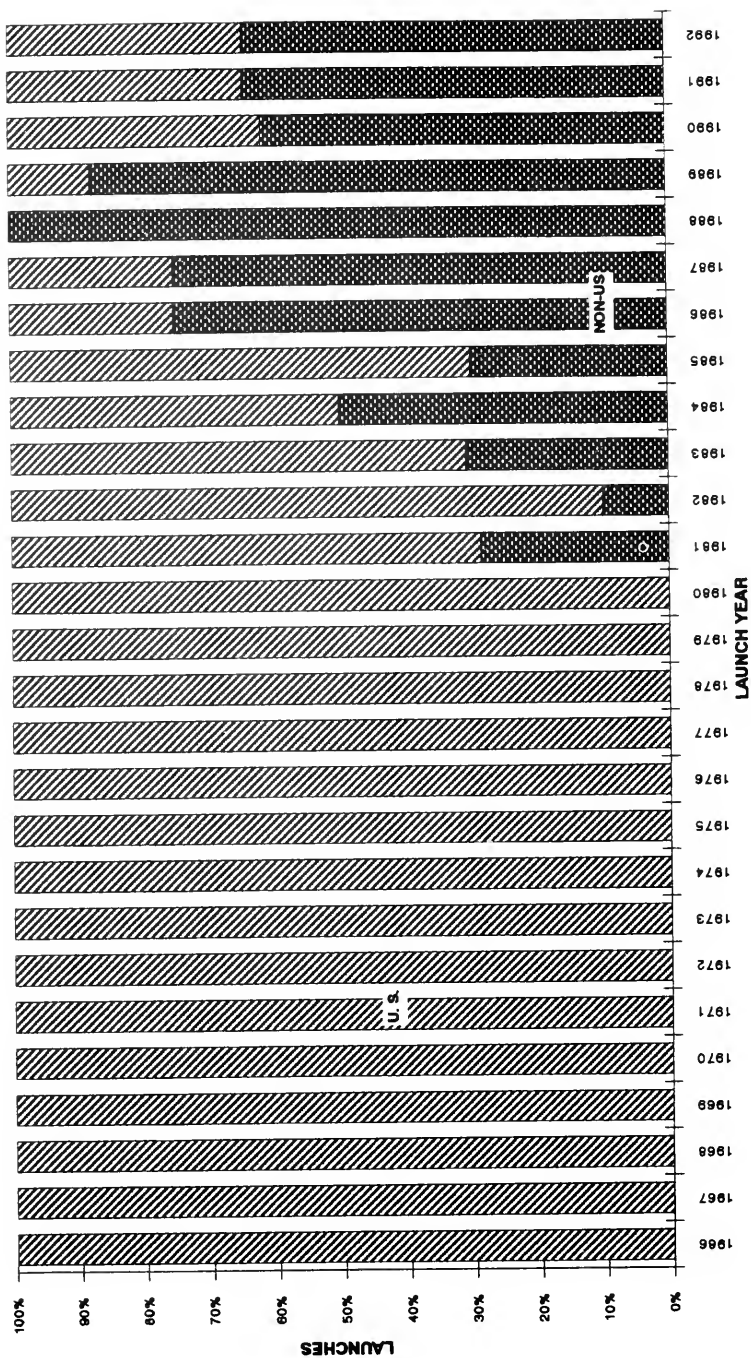


## COMMERCIAL LAUNCH MARKET SHARE

The U.S. share of the launcher market has eroded to about 35%.

The market is dominated by Ariane

## COMMERCIAL LAUNCH MARKET SHARE



## **COST TO GEOSYNCHRONOUS**

The AIAA report provides booster payload capability and launch cost ranges (high-low).

The chart is a plot of mean launch costs vs. booster capability to a geosynchronous orbit.

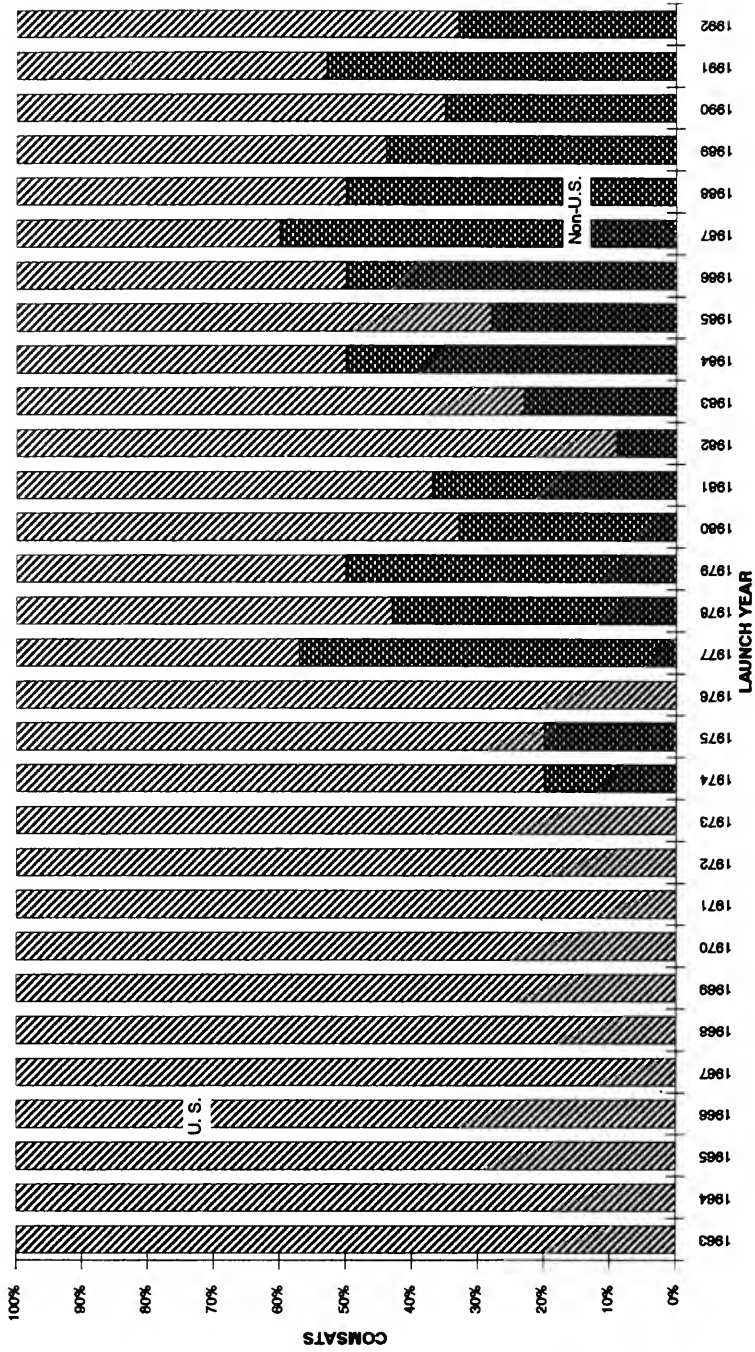


## COMSAT MARKET SHARE

The U.S. is losing share in the ComSat market.

The U.S. position has eroded to about 70%

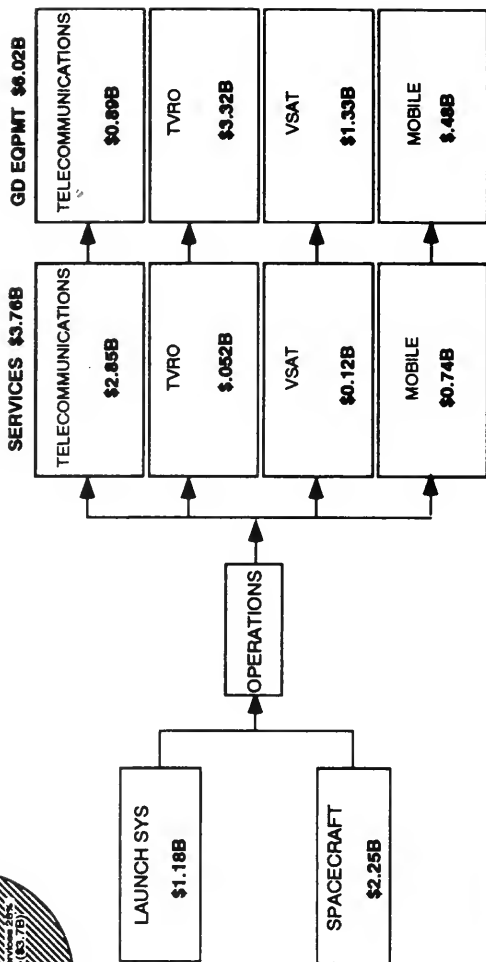
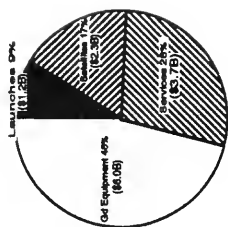
## COMSAT MARKET SHARE



## **WORLD-WIDE SPACE COMMERCE-1992**

The World-Wide Space Commerce for 1992 was derived using the revenue data reported by Space Business Indicators, June 1992, US Department of Commerce. The document reports on the U.S. revenue for the major segments of the U. S. commercial space industry. The report also provides U.S. share of the global market. This information, in conjunction with similar information in Euroconsult's World Space Survey, 10 Year Outlook, 1989/90 Edition was used to estimate the worldwide commercial space market.

# WORLD-WIDE SPACE COMMERCE -1992



**TOTAL ~\$13.2B**

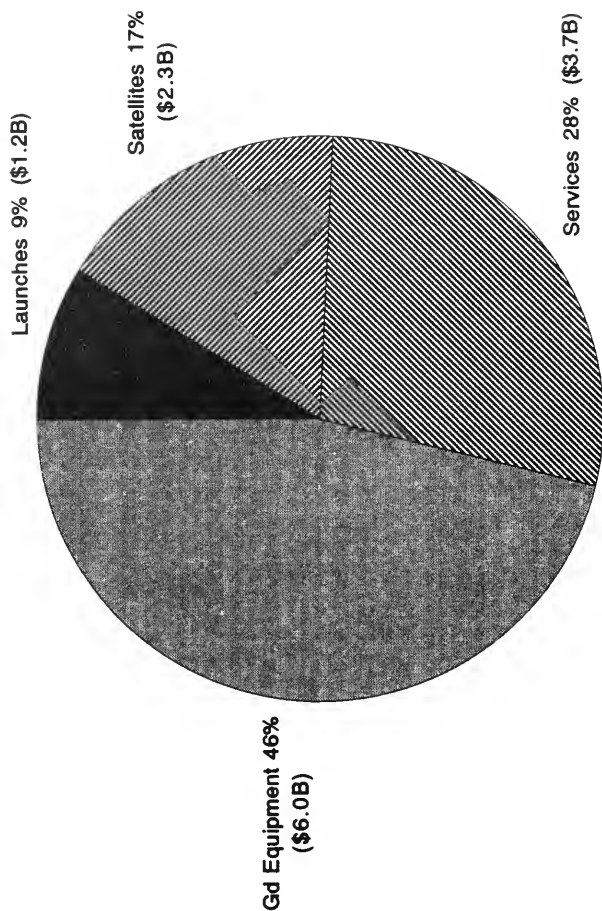
Space Business Indicators, Dept of Commerce, June 1992  
 World Space Industry Survey, Euroconsult, 1989/90 Edition  
 U.S. Industrial Outlook 1993, Dept of Commerce, Jan 1993



## 1992 COMMERCIAL SPACE REVENUE SOURCES

The launch industry represents less than 10% of the total market.

## 1992 WORLDWIDE COMMERCIAL SPACE REVENUES SOURCES



Source: Space Business Indicators, Dept of Commerce, June 1992;  
World Space Industry Survey, Euroconsult, 1989/90 Edition;  
U.S. Industrial Outlook 1993, Dept of Commerce, Jan 1993

## GEO-SYNCHRONOUS SATELLITE ENVIRONMENT

This chart was generated using the Global Satellite Location data prepared by Walter L. Morgan for Satellite Communications magazine. This report identified the expected launch dates for "C" and "Ku" communications satellites at geo-synchronous orbit.

The "Actual" data in red reflects launches which occurred up to 1992. Launch dates identified by the report for dates beyond 1992 are reflected as "Planned", in green. The "Predicted" (blue) plot data was analytically derived by adding the satellite design life (years) to the launch date of current on-orbit operational systems.

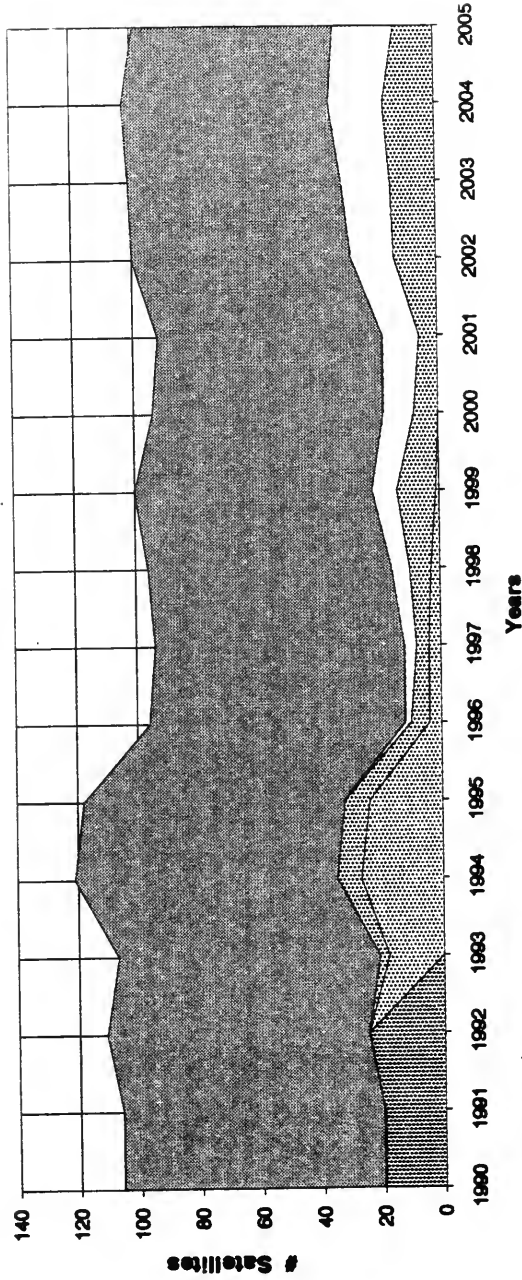
The unfilled geo-population (grey area) represents those geo-synchronous orbital positions (86) for which licenses have been issued but remain unfilled. It is assumed that many of these positions are awaiting financing and that they would be filled if the cost to orbit was reduced.

The "Node Fill rate 2/Yr" (yellow) shows the effect on the Unfilled nodes based on an increased satellite rate (2 per year). The peak (1994) in the number of planned and predicted geo-synchronous satellites is a common occurrence and historically is one year away and slips to the right.

# **GEO-SYNCHRONOUS SATELLITE ENVIRONMENT**

**POTENTIAL**

**ANNUAL**



Source: Global Satellite Locations, Satellite Communications, Jan 1992

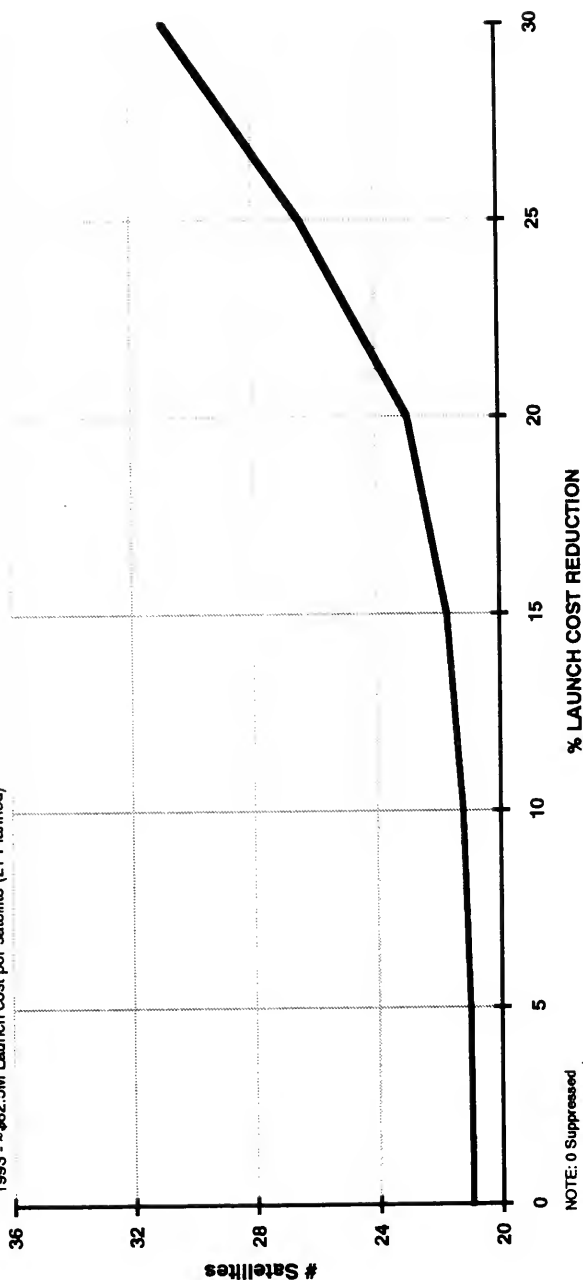
## INCREASED DEMAND

We estimate that there will be an increased demand as the cost of access to space decreases, and that at around a 15-20% reduction in cost, the unfilled nodes' will become significantly more attractive to investment money.

A Launch Demand model was developed by interviewing Financial, System Engineering and Technical Marketing personnel within Lockheed. The survey posed the following question, "If launch costs were reduced by 5%, and you were in the Comsat business would you change the current pace of program implementation, launch schedule, pursuit of funds based on this more favorable fiscal situation?". The same question was posed using 10%, 15%, 20%, 25% and 30% cost reduction values. Each response, given a "yes" was followed by a second question designed to address the elasticity of "risk". The question was, "given you had the opportunity to finance up to 100 satellite builds, how many would you finance based upon the change in launch cost (5%, 10%, 15%, etc.)?". The results of the two level survey resulted in the curve above.

# INCREASED DEMAND

1993 - ~\$62.5M Launch cost per satellite (21 Planned)



NOTE: 0 Suppressed

## LAUNCH SEGMENT REVENUE

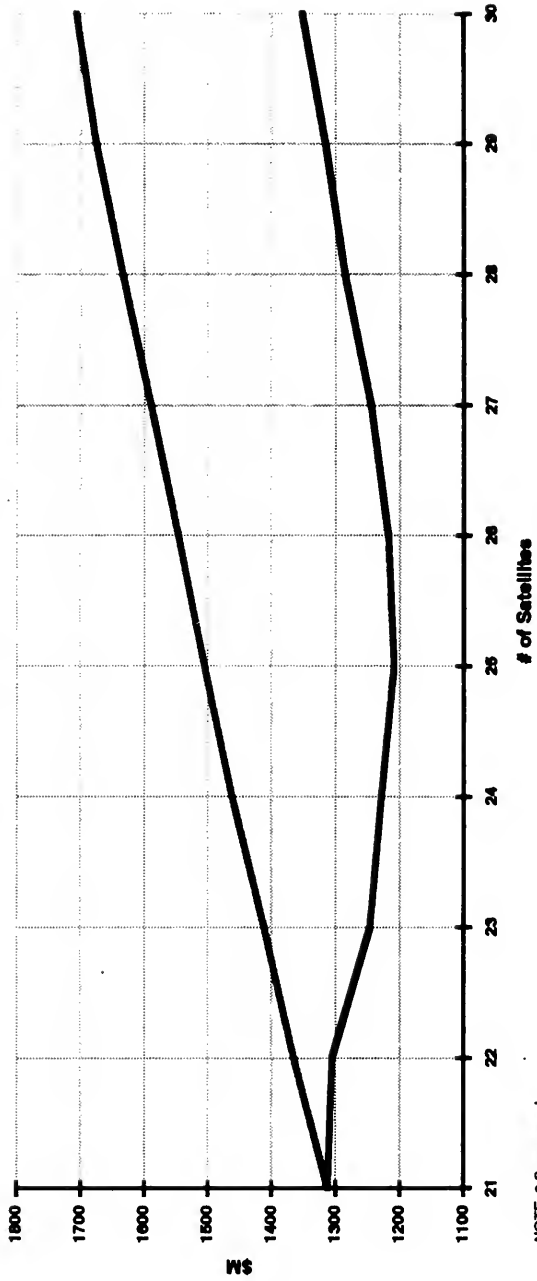
The average launch cost was derived from Space Business Indicators, June 1992, U.S. Department of Commerce. The report (pg 1) identified 8 U.S. commercial satellites were to be launched at the cost of \$450M (\$62.5M average). This value was used as current launch cost for purposes of estimating revenue and cost for launches for this analysis.

As the price of launch is lowered, the total revenue for the launch segment market declines. However, at a sufficient cost reduction, the demand for new launches makes up in total for the individual launch income reduction.

The "Reduced-All Launches" curve reflects the revenue generated when reduced launch cost pricing is applied to all launches once demand is established.

The "Reduced-Next Launch" curve reflects the revenue generated by retaining the average launch cost for the initial 21 "Planned" launches and adding the appropriate number of launches at their reduced cost.

## LAUNCH SEGMENT REVENUE (\$M)



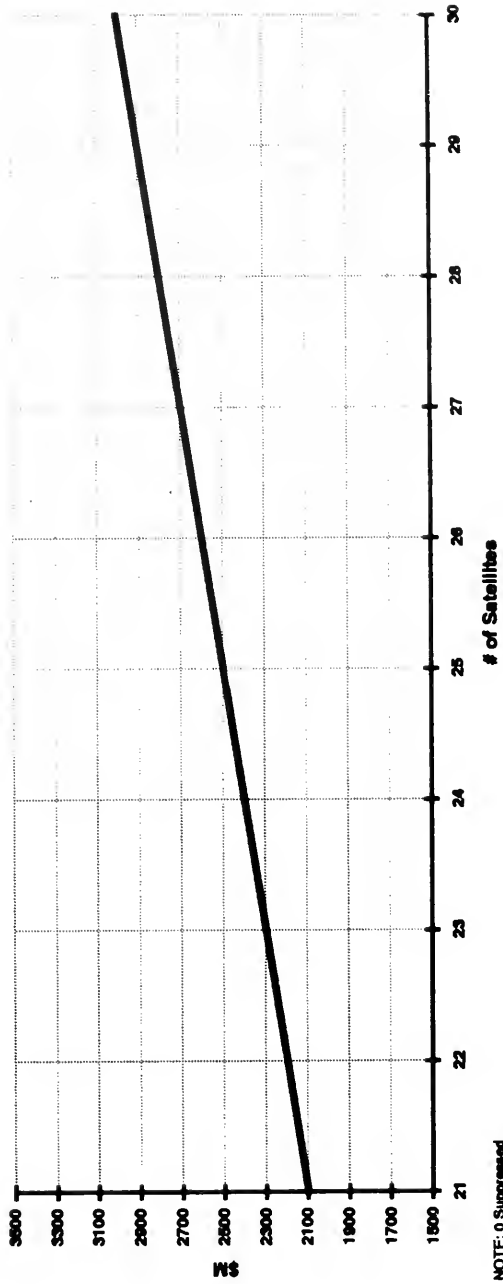
NOTE: 0 Suppressed



## **SPACECRAFT SEGMENT REVENUE**

Every commercial Geo ComSat sold is worth \$100M on average. This value was derived from Space Business Indicators, Jun 1992, (10 satellites for \$1.1B), and U. S. Industrial Outlook 1993-Space Commerce (5 foreign satellites for \$500M). For computational purposes the 21 satellites to be launched in 1992 as identified by the Global Satellite Locations article were used as a starting point.

## SPACECRAFT SEGMENT REVENUE (\$M)

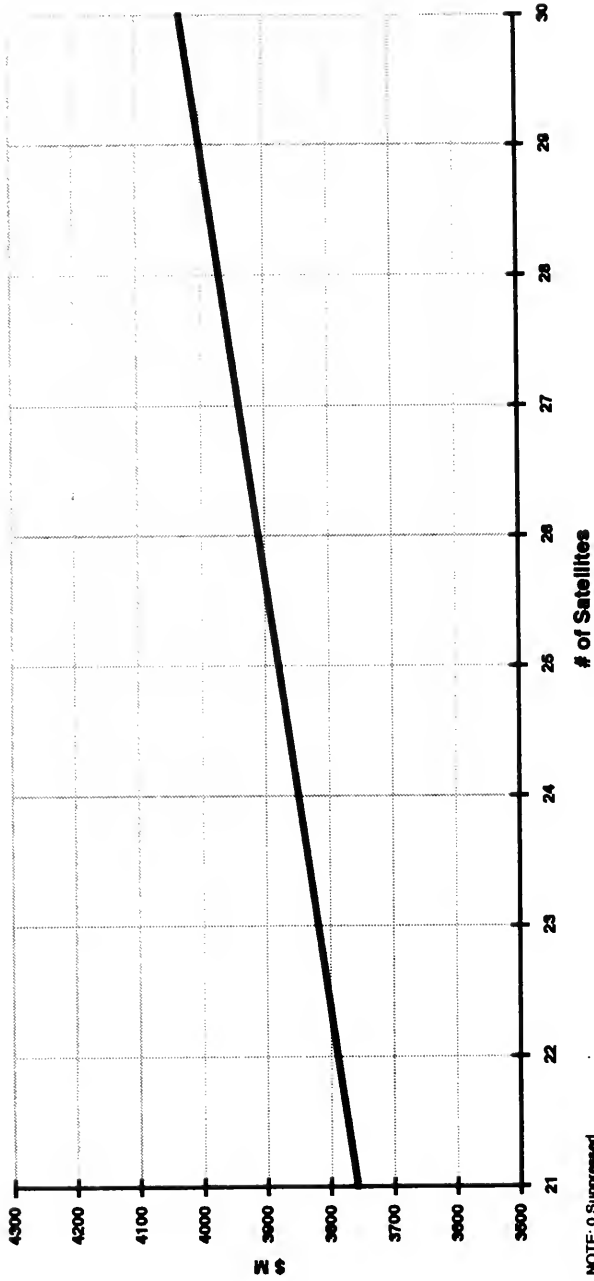


## SATELLITE SERVICES REVENUE

Every new satellite that comes on line means an increase in service revenue. The estimated 1992 Service revenues of \$3.76B was generated by ~120 satellites on orbit with ~2500 transponders. On average each satellite generates ~\$30M of service revenues per year. Of course newer satellites are more capable and generate more revenue.

Data used to derive revenue was garnered from Euroconsult's World Space Industry, 10 Year Outlook, 1989/90 Edition. This source reflects ~2500 transponders on orbit by 1992.

# **SATELLITE SERVICES REVENUE**

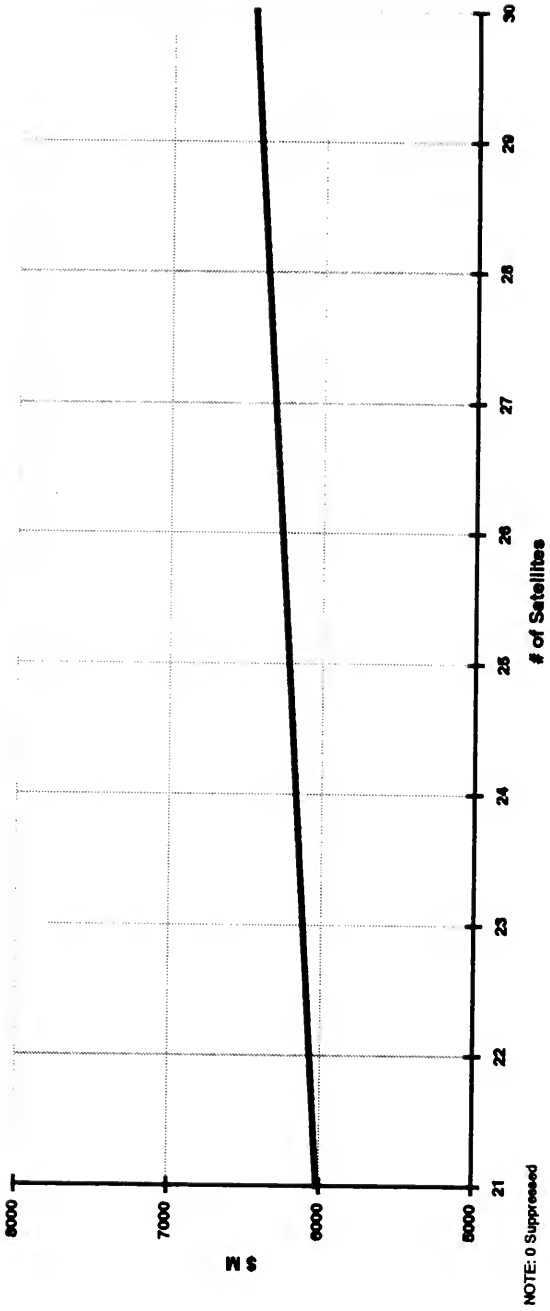


## GROUND SEGMENT REVENUE

Every new satellite that comes on line means an increase in Ground Equipment revenue. Estimated Ground Equipment revenues in 1992 of \$6.02B was generated by ~120 satellites on orbit with ~2500 transponders. On average each transponder generates \$2.4M of Ground equipment revenues per year. Of course newer satellites are more capable and generate more revenue. The move to Ku Band is driving down the price of ground terminals.

Data used to derive revenue was garnered from Euroconsult's World Space Industry, 10 Year Outlook, 1989/90 Edition. This source reflects ~2500 transponders on orbit by 1992. The average number of transponders per satellite is 21 (2500/120).

## GROUND SEGMENT REVENUE



## TOTAL COMMERCIAL SPACE REVENUE

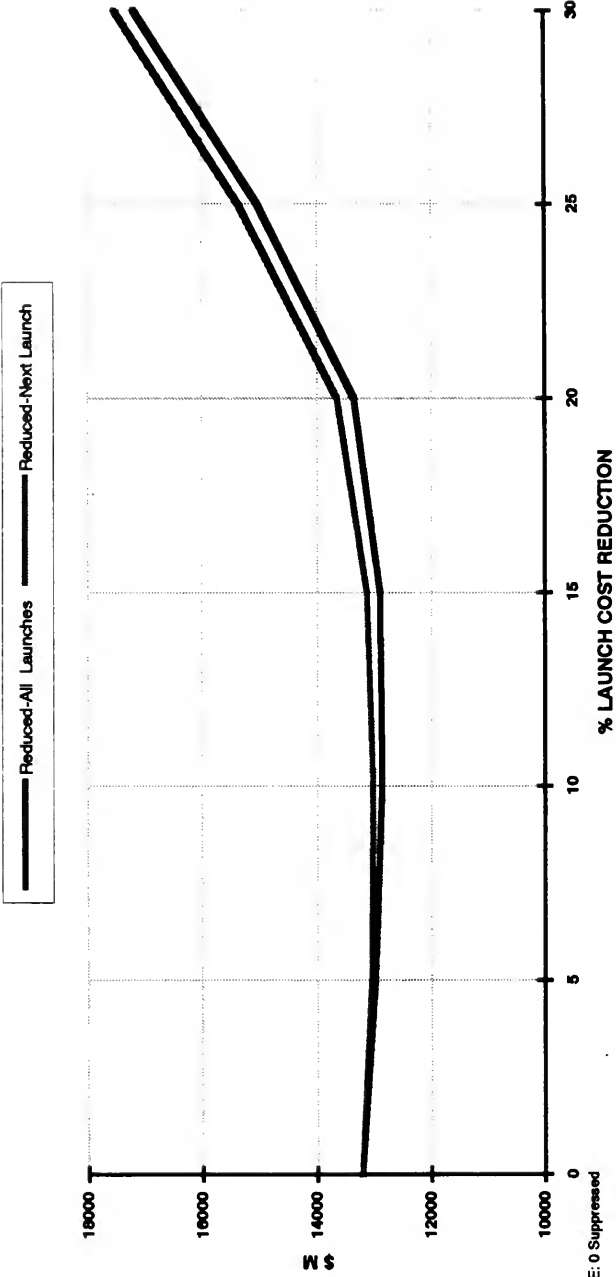
Summing the previous four charts results in an estimate of the total commercial space market revenue.

A decrease in launcher costs of greater than 20% will result in an increase in total commercial space revenue.

The "Reduced-All Launches" curve reflects the revenue generated when reduced launch cost pricing is applied to all launches.

The "Reduced-Next Launch" curve reflects the total revenue generated by retaining the average launch cost for the initial 21 "Planned" launches and adding the appropriate number of launches at their reduced cost.

## TOTAL COMMERCIAL SPACE REVENUE





Ms. HARMAN. Thank you very much.

Sadly, we are going to recess just for a few moments, because the chairman is not back and this vote only has four minutes to go, and the two of us must leave, but I know he is returning almost immediately, and we will resume the panel.

I thank all of you who have testified. We look forward to the rest of you in just a few moments.

[Recess.]

Mr. HALL [presiding]. Mr. Kehlet, I believe you were testifying.

Mr. KEHLET. Thank you, Mr. Chairman.

I am Alan Kehlet. I am vice president of the Space Transportation Division of McDonnell Douglas Space Systems. I am pleased to be here today and give you our views and recommendations regarding international space.

First of all, I would like to commend the subcommittee for your past efforts on your role as the originator of the 1984 Commercial Space Launch Act, for your subsequent amendments to the third party liability claims, and for the creation of new funding programs to modernize our infrastructure for commercial and Government uses.

McDonnell Douglas provides launch services with the Delta launch vehicle, and Delta has the world's best reliability record. Over the past seven years, including last week's launch, we have now placed 42 satellites into orbit out of 42 attempts—pretty hard to beat, 100 percent success.

One of the keys to our successful launch record has been the implementation of Total Quality Management, because with TQM we have achieved significant results. Cycle time on the pad, for example, has been reduced from 40 days to about 25, and our manufacturing assembly costs over the past five years have been reduced by about 30 percent.

We are doing well. However, relative to the competition of the international industries, we are limited in further cost reductions without vehicle and infrastructure technology improvements. So it is from this background I will describe the nature of the international space launch market, our view of the market, and our recommendations for the Government's role.

Vice President Gore, during his election campaign, stated that our last surviving crown jewel is the American aerospace industry. As a source for technological innovation, it has far-reaching implications for every sector of the American economy. Indeed, it holds one of the keys to future prosperity in the United States.

While all of us in industry agree with the Vice President's statement on the value of aerospace, space transportation's part of the aerospace industry is a fundamental building block for space leadership. The U.S. must stay active in this space transportation to retain this leadership and maintain its national security. The international commercial market is an essential part of this space transportation. We must keep up with technology advances to stay competitive in the world market.

Now although Delta is on the small end of the launchers for geosynchronous satellites, each Delta that is sold keeps about 2,500 direct and indirect jobs in the economy, and the benefits are even larger for the vehicles that are greater.

So compared to a new vehicle, an infrastructure offered by, let's say, Ariane, the Delta design and launch equipment was started three decades ago, and we are thankful that Delta has been continuously upgraded by both the Government and by McDonnell Douglas investment over the years. But we still require 12 very expensive propulsion engines for each launch and time-consuming assembly on the launch pad, an assembly system well behind the newer cost-effective systems implemented by the Europeans, Japanese, and Russians.

Also, the international launch market is diminishing. Today, the world-wide commercial launch vehicle supply exceeds the commercial satellite demand. In our estimation, the demand for launches is projected to drop from 22 missions in 1994 to about 12 in 1998 mainly because the demand that built up after the Challenger accident has been reduced and because the higher-quality satellites that are being launched today are expected to have a longer lifetime.

I will take exception to my colleague from Lockheed. We don't think the supply is going to increase dramatically but, rather, stay constant after the year 1996/98.

So as the satellite market decreases, the competition is increasing with our international competitors having a number of advantages over us. First, they are all nationalized or heavily subsidized by their government, investing in newer designs, more cost-effective vehicles. Another advantage for some of our international competitors, particularly those with nonmarket economies, is that they have never accounted for the true costs of running a business and have received subsidies to develop and operate their launch system.

Our view of the market as a leader in the space launch industry is to work with the Government as a team to capitalize on innovative technologies so we may better serve all of our launch customers and retain our position in the market. To increase the competitiveness of the U.S. launch industry and reduce the cost to the U.S. Government we propose a number of steps: first, that a Government-industry team develop the necessary technologies, particularly low-cost, liquid rocket engines and stages; second, to augment our launch services, investment is needed in more efficient launch infrastructure at our national ranges; and, third, our market share of the international space business must be regained; if we can provide a common, low-cost launch service to serve many customers—commercial, defense, and NASA—we will be able to reduce the cost to everyone; and, fourth, even though we have had productivity gains, we must increase those productivity gains and reduce costs.

There are two important things we think the Government can do to support the U.S. space launch industry: one, develop the—fund the development of low-cost technology advancements; and, two, promote fair competition in the international market. Both Government and industry acknowledge the need for a modern, cost-effective national launch system. We need the commitment and funding and support of the Government to get started.

The Commercial Space Transportation Advisory Committee—COMSTAC—under the Department of Transportation, has identified high-priority critical component technologies such as rocket propulsion, structures, avionics, for further reducing cost and im-

proving reliability. We can also enhance the cost-effectiveness of our infrastructure by implementing the Air Force's recent recommendations.

I predict that if the Government would fund low-cost production and other related vehicle systems, fund the modernization of the infrastructure, and offer sizable multi-year procurements, then industry will share in the required investment to incorporate these technologies in the launch vehicles as a team effort of Government plus industry solving a critical problem that benefits all. To do nothing and make no investments will result in a continuous erosion of our vital national space resource which is critical to our national defense and international leadership.

With the recent efforts towards negotiating a new trade agreement with the Russians, the U.S. Government has taken a more proactive role in shaping international space transportation policies and establishing launch trade agreements to promote fair business practices. McDonnell Douglas supports the industry position for negotiation of an effective and enforceable commercial launch services international trade agreement. We think the agreement has to have three parts: First, the policy must be comprehensive; it should establish fair and workable price standards; and, third, the policy should establish a reasonable limit on quantity of launches.

For the current case of negotiations between the U.S. and the Russians, marketing considerations would lead to the conclusion that a reasonable quota for the Russians would be very small, and indeed that has been the case.

Regardless of the final outcome, it is clear that all of the Western nations have an obligation to participate in the U.S. policy of supporting the current Russian transition. As part of that obligation, the Europeans, who now enjoy a major share of the market, need to share in the cost of the Russian transition. Ariane should allocate a reasonable part of their market to the Russians and the share in the pain of the West of creating a healthier, better space market for all.

In summary, we in the U.S. launch industry are facing serious challenges in the international market. We believe in a healthy U.S. industry which is critical to our national defense, and we in the industry—we, the industry, and the Government must work together as a team in order to regain our leadership in space and protect our national security. So we both need to invest in ways that can best utilize our skills and resources.

Thank you, Mr. Chairman, for the opportunity to present these views, and I look forward to your questions.

[The prepared statement of Mr. Kehlet follows:]

**STATEMENT OF**

**ALAN B. KEHLET**

**VICE PRESIDENT**

**DEPUTY GENERAL MANAGER**

**SPACE TRANSPORTATION DIVISION**

**SPACE SYSTEMS**

**MCDONNELL DOUGLAS AEROSPACE**

**BEFORE THE SUBCOMMITTEE ON SPACE**

**COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY**

**UNITED STATES HOUSE OF REPRESENTATIVES**

**MAY 19, 1993**

Mr. Chairman and members of the Subcommittee on Space,

As Vice President Deputy-General Manager of the Space Transportation Division at McDonnell Douglas Space Systems, I thank you, Mr. Chairman, for the invitation to participate and I am pleased to appear and provide you with our views and recommendations regarding the international space launch market.

The subcommittee is to be commended for your past efforts and accomplishments to assist the launch industry. Specifically, the milestone results to date include -

1. Your role as originator of the 1984 Commercial Space Launch Act that made national facilities available for commercial use;
2. The subsequent amendments providing for government payment of excess third party liability claims and the extension to the year 2000 of these risk sharing provisions; and
3. The creation of a new grant funding program to modernize infrastructure usable for commercial and government needs.

We in the US space industry appreciate and thank you for your efforts to bring the US closer to the standard of commercial space transportation in the rest of the world - that standard being a close, supportive, and successful team relationship between government and industry.

McDonnell Douglas provides launch services with the Delta launch vehicle. The Delta has the world's best reliability record. Over the past 7 years, and including last week's launch, we have successfully launched 42 out of 42 payloads into orbit—a success rate of 100%. A key to our successful launch record, has been the implementation of the Total Quality Management System. With TQM we have achieved significant results. Cycle time on the launch pad has been reduced from 40 days to a demonstrated 25; manufacturing assembly costs over the past 5 years have been reduced by 30%. McDonnell Douglas is doing well; however, relative to the competitive international industries, we are limited in further cost reductions without vehicle and infrastructure technology improvements.

From this background, I will describe the nature of the international space launch market, our view of this market, and our recommendations for the government's role.

### **The International Space Launch Market**

Vice President Gore, during his election campaign, stated that "Our last surviving crown jewel is the American aerospace industry. As a source for technological innovation, it has far-reaching implications for every sector of the American economy. Indeed, it holds one of the keys to future prosperity of the United States" (statement made on October 19, 1992 at Goddard Space Flight Center).

All of us in the industry agree with the Vice President's statement on the value of aerospace. Space transportation's part of the aerospace industry is a fundamental building block for space leadership. The US must stay active in space transportation to retain this leadership and to maintain our national security. The international commercial market is an essential part of space transportation. We must keep up with technology advances to stay competitive in the international market.

Although the medium launch vehicle Delta is on the small end of the launchers for geosynchronous satellites, each Delta that is sold keeps about 2,500 direct and indirect jobs in the economy. The benefits for the larger vehicles are even greater.

Compared to the new vehicle and infrastructure offered by Ariane, the Delta design and launch equipment was started three decades ago and we are thankful that the Delta has been upgraded by both the government and my company's investments over the years. But we are still encumbered by 12 propulsive engines for each launch and the time consuming vehicle assembly on the launch pad - a system well behind the newer, cost-effective systems implemented by the Europeans, Japanese, and the Russians.

The international space launch market is diminishing. Today, the worldwide commercial launch vehicle supply exceeds the commercial satellite demand. In our estimation, the demand for launches is projected to drop from 22 missions in 1994 to 12 in 1998—mainly because the demand that built up after the Challenger accident has been reduced and because the higher quality satellites being launched today are expected to provide longer lifetime in orbit.

As the satellite market decreases, the competition is increasing with our international competitors having advantages over the US space launch industry.

First, they are all nationalized or heavily subsidized by their governments. They employ an government-industry team approach to improving launch services, which is resulting in more advanced launch systems with modern technologies that can better serve the market at lower costs.

They are investing in and designing newer, more cost-effective vehicles. For example, Ariane 5, which will be introduced in October 1996, will be able to launch at a 40% cost savings compared with the current Ariane 4 by using modern manufacturing and innovative technology.

In addition to a new cryogenic engine and new solid rocket motors, Ariane's development includes a new infrastructure at Kourou, French Guiana—all paid for by the European governments supporting the Ariane program.

Arianespace is currently dominating the ELV industry with about 60% of the international market for commercial launches, and as a matter of policy will continue getting government support to retain that share of the market. With Ariane 5, Arianespace will consolidate its position and more easily retain its market share.

Another advantage for some of our international competitors, particularly those with nonmarket economies, is that they have never accounted for true costs of running a business and have received subsidies to develop and operate their launch operations. Therefore they are able to provide launch services at a much lower price than the US. There is a lack of a level playing field to keep their prices on a fair "western" basis, in line with market rates.

Today, with the advantages that our competitors have over us, the US space launch industry is having difficulty retaining its commercial market share and its position of leadership in space.

#### **McDonnell Douglas' View of the Market**

McDonnell Douglas is a leader in the space launch industry. The mission of our company is to support the US government and international commercial space by providing high-quality, affordable products for space.

Our perceived future vision is to work with the government as a team to capitalize on innovative technologies so that we may better serve all of our launch customers and retain our position in the market. In order to be internationally competitive, US participants must offer high reliability, low cost, and high performance. To increase the competitiveness of the US launch industry and reduce our costs for US government missions, we propose a number of steps.

First, that a government-industry team develop the necessary technologies - particularly low cost liquid rocket engine systems and stages - that will provide launch services that are more reliable and cost-effective.

Second, to augment our launch services, investment is needed in more efficient launch infrastructure at our national ranges. To streamline launch operations and better serve all customers, a long-term Range Modernization Program has been defined by the Air Force. Such improvements will provide both short- and long-term benefits to our space launch industry.

Third, our market share of the commercial space business must be regained. If we can provide a common low-cost launch service that can serve many customers—commercial, defense, and NASA—we will be able to reduce the costs of our launch service to all customers.

Fourth, productivity must be increased and costs must be reduced. We need not only to streamline our manufacturing and launch operations processes, but also to develop launch vehicle designs that simplify both processes.

#### **The Government's Role**

There are two important things that the government can do to support our national defense and the US space launch industry: (1) fund the development of low cost new technology advancements, and (2) promote fair competition in the international market.

#### **Technology Advancements**

Both industry and government acknowledge the need for a modern cost-effective national launch system. In fact, there have been over 600 different studies by industry and government, yet we have no direction or commitment to proceed. We need the commitment and funding support of the government to get started. Such a cost-effective system would enable us to satisfy missions for government customers at reduced cost and improved reliability, and increase the competitiveness of the US launch vehicle industry in the international commercial market.

To bridge the gap to a modern national launch system and to remain competitive, we must improve our existing fleet with new technology. The Commercial Space Transportation Advisory Committee (COMSTAC) under the Department of Transportation has identified high priority critical component technologies - such as rocket propulsion, structures and avionics - for reducing costs and improving reliability (Reference 2). We can also enhance the cost-effectiveness of our infrastructure by implementing the Air Force's recent recommendations.

I predict that if the government would fund the development of low cost propulsion and other related vehicle systems, fund the modernization of the infrastructure, and offer sizable multi-year procurements, then industry will share in the required investment to incorporate the new technologies into launch vehicle developments - a team effort of government plus industry solving a critical problem that benefits all. The taxpayers will benefit by the government's procuring cost-effective solutions on future government missions and, in addition, realize a return on the investment. To do nothing and make no investments will result in continual erosion of our vital national space resource which is critical to our national defense.

#### **Establish International trade agreement for commercial launch services**

With the recent efforts toward negotiating a new trade agreement with the Russians, the US government has taken a more proactive role in shaping international space transportation trade policy and establishing space launch trade agreements to promote fair business practices. The



entrance of nonmarket economies with unfair prices and subsidies in the international market could easily disrupt an already limited and fragile commercial space launch market.

The successful suppliers of the future will be those who can offer reliable launch services, on time, and at low cost. Currently, nonmarket economy countries entering the western space launch market are able to offer launches at prices far below western market prices. To prevent them from dominating the market with their lower prices, the government must quickly take interim measures to regulate their participation until such time when they have transitioned to a market economy.

McDonnell Douglas supports the industry position for the negotiation of an effective and enforceable commercial launch services international trade agreement. There are three major components to such a policy.

First, the policy must be comprehensive, consistent, and enforceable. We should not allow exceptions to policy, such as the one-time exception with the US Inmarsat. The government should review the agreement periodically for adherence and applicability.

Second, the policy should establish a fair, workable pricing standard to allow only fair-priced entry of nonmarket economies into the launch market. This pricing standard should be based on the prices of market economy suppliers.

Third, the policy should establish a reasonable limit on the quantity of launches. With the massive launch capabilities of our competitors' infrastructures, a reasonable limit is necessary. The reasoning that led to the prior quota for the PRC, in the 1989 trade agreement, is a sound approach.

For the current case of negotiations between the US and Russia, a similar reasoning should lead to the conclusion that a reasonable quota would be very small, and dictated by a realistic mission model of future satellites. And all future trade agreements - whether the PRC, Russia, or the Europeans - should include strong enforcement measures to ensure compliance with the agreement.

Regardless of the final outcome with the Russians, it is clear that all of the western nations have an obligation to participate in the US policy of supporting the current Russian transition. As part of that obligation, the Europeans - who now enjoy a major share of the market - need to share in the cost of the Russian transition. Ariane should allocate a reasonable part of their market to the Russians and to "share in the pain to the west" of creating a better, healthier space market for all.

## Summary

In summary, we in the US space launch industry are facing serious challenges in the international market.

We believe in a healthy US industry which is critical for our nation's defense.

We, the US industry and the government, must work together as a team in order to retain our leadership in space and to protect our national security interests,

We, the industry and government must both invest in ways that can best utilize our skills and resources.

Thank you for the opportunity to present our views on this nationally important topic.

**Reference**

COMSTAC International Competition Working Group, Report of the COMSTAC Task Group on Soviet Entry Into the World Space Market. Commercial Space Transportation Advisory Committee, Office of Commercial Space Transportation, US Department of Transportation, August 1992.

Mr. HALL. We thank you, and the chair recognizes Mr. Thompson.

Mr. THOMPSON. Good afternoon, Chairman Hall and members and staff of the subcommittee. I appreciate the chance to discuss Orbital's views on international competition in the small satellite segment of the space launch services market.

As some of you may know, Orbital is an 11-year-old commercial space company which, during its relatively brief history, has generated about \$600 million in cumulative sales and about 12,000 person years of direct and subcontract employment. Along the way, we have developed two new technology space launch vehicles that put payloads weighing between about 1,000 pounds and about 3,000 pounds into low orbits about the Earth.

Building on this technology base, we intend to be first to market later this year with the first commercial distributed global digital communications system and with the first private remote sensing satellite.

Our view of the small satellite part of the space launch industry is characterized as follows:

First, American suppliers in this segment of the market—and there are three or four active companies in this part of the market today—have exhibited a great deal of creativity in bringing new products to market largely with private capital and are intensely competitive with one another in that segment of the market.

Second, the U.S. Government has played a critical role not only in providing the technology assistance that has been required to develop some of these products but, more importantly, serving as a very good anchor customer for early purchases of this new generation of launch vehicles.

Finally, the result of this combination of private initiative and Government launch purchases has been the following: Since the mid-1980's we have seen a three-fold reduction in the cost per pound of space transportation for small satellites; we have seen virtually 100 percent of over 100 satellite launch contracts awarded in the last three and a half years go to U.S. suppliers. I think as we look ahead for the next two or three years we can anticipate, with this background, more cost reductions on the way by the mid-1990's, approaching a 50 percent improvement over what is available today.

The global market is rapidly developing for small payload launch services. It is expected to grow from about eight launches this year in this class to 12 to 15 launches next year and to some 25 or more launches by the mid to late 1990's. If this happens, it will make the small payload launch market between 25 percent and a third of the total worldwide commercial launch market in dollar terms and certainly make it even larger than that in terms of launch events. In fact, today my company is in pursuit of new contracts from five countries outside of our borders for some of these contracts.

At the same time though, we see evidence of increasing competition from foreign suppliers in this part of the market. Eight to 10 other countries, most with government-sponsored product development and production programs, are either in the market today or are planning to enter the market within the next year or so. We

welcome the competition if it is fair. I think that has made the U.S. industry, through the intense rivalry that exists in this segment of the market, very strong, but so far we have seen very little reason to expect that the competition is likely to always be fair in the future.

I believe that there are four principal recommendations that should be considered by your subcommittee with respect to the U.S. Government's role in this part of the space launch market. First and most importantly, U.S. Government agencies that have pioneered the use of advanced technology small satellites should continue to be good customers for domestic launch services.

By this I mean that Government agencies should not develop or operate their own launch vehicles but should buy commercial launch services whenever practical. In addition, they should not use international sources of launch services for Government missions, and, when possible, they should increase the predictability of their own demand by increased purchasing of lot sizes and launch rates.

My second and third recommendations are very much in accord with those that you just heard from my colleague from McDonnell Douglas, Al. Let me state those in terms that may be a little more focused on the small segment of the market. My second recommendation is that the Government and industry should enter into technology partnerships aimed at using advanced technology to dramatically reduce the cost of access to space for small launch vehicles. I think we should set our sights here on a vehicle that will not just be a world-class product five years from now but will, through upgrades, be a world-class product a generation from now.

There are ample precedents for this over the last five years in this part of the industry. I can cite both the Advanced Research Projects Agency's Advanced Space Technology Program and various initiatives that NASA has supported that have enabled product development by my company and my competitors in this industry to go forward.

Today I think our technological challenges are greater, although our market opportunities are more clear. R&D partnerships with NASA and ARPA technology funds and with private funds together with anchor customer commitments for this new generation of vehicles I believe will make possible by 1997 or 1998 at least a 50 percent reduction in cost-per-pound of payload transport for vehicles in this part of the market.

My third recommendation, again paralleling Al's—I believe Al's first recommendation—was, the Government, through the good offices of the Trade Representative and any other tools at its disposal, should maintain a fair, competitive environment for free enterprise in the small part of the market as well. This includes ensuring that no U.S. small satellites are exported without fair pricing agreements that are enforceable, and it also includes a very thoughtful policy with respect to the reuse of U.S. strategic missiles on foreign ICBM's so that those products are not dumped on the market to the detriment of those companies that have invested private capital in advanced technology launch vehicles.

Finally, I think that there are opportunities for the U.S. Government to promote export sales that have not been taken full advantage of.

tage of. U.S. small satellite builders and U.S. small launch services providers dominate this part of the market today. We are well ahead of foreign competition in both launch services and in satellites. To remain in that position, I think it is important that we look at relaxing technology transfer restrictions, building in suitable protections against undesirable transfer of technology but, at the same time, balancing the desire to promote U.S. exports of both satellites and launch vehicles.

And, finally, I suggest that we look at allowing Export-Import Bank financing to apply to launch services sales from U.S. sites as well as exports of products to foreign countries. As I understand it today, Export-Import Bank financing is not available when a commercial launch service is provided to a foreign customer from a U.S. site.

I again appreciate the opportunity to testify before your committee this afternoon.

[The prepared statement of Mr. Thompson follows:]

Testimony of  
David W. Thompson  
President and Chief Executive Officer  
Orbital Sciences Corporation  
before  
The Subcommittee on Space  
Committee on Science, Space and Technology  
United States House of Representatives  
May 19, 1993

Mr. Chairman, Mr. Sensenbrenner and other Distinguished Members of the Subcommittee:

I appreciate the opportunity to assist the Subcommittee in its examination of the international space launch services environment and its impact upon the United States domestic launch industry. Mr. Chairman, I congratulate you and Mr. Sensenbrenner for calling this important hearing during the early days of both the 103rd Congress and the Clinton Administration. We in the U.S. launch industry also recognize that international competition in launch services is a fast moving train in need of careful guidance and monitoring as it proceeds into uncharted territory.

Commercial Space Launch Industry Today

Those of us on the "small" end of the space industry know a bit about "uncharted territory." Over ten years ago, Scott Webster, Bruce Ferguson and I formed Orbital Sciences Corporation to commercialize space technology. Since that time, Orbital has generated over \$600 million in cumulative sales and created over 12,000 person-years of direct and subcontract high-technology employment. Taking a "smaller, faster, cheaper" approach to our programs, we have led the development of four families of new suborbital launch vehicles, two space launch vehicles, an orbit transfer vehicle, two spacecraft platforms, and a number satellite tracking systems and related space support products. Most of the products have been developed with private capital and are intended for government and commercial customers, both in the U.S. and abroad. In the last four years, we have conducted nearly 40 challenging space missions that have advanced science, commerce and defense in the United States. We have helped to stimulate the "microspace revolution" by expanding

beyond traditional space markets to new distributed global communications and remote sensing satellite services.

Acting as "anchor customer," the U.S. Government has played a critical role in encouraging development of a commercial launch industry and in providing incentives for companies like Orbital to enter the small launch vehicle market (i.e., the market for payloads weighing 3,000 pounds or less in low-Earth orbit). The results have been most impressive. During the past five years, American launch companies have achieved dramatic reductions in the cost of Earth-to-orbit transport for small payloads. These companies have invested their own capital to develop a new generation of technologically advanced small rockets three times cheaper, on a cost-per-payload-pound basis, than mid-1980's-vintage launchers. They have captured practically all of the 100-plus small rocket contracts awarded worldwide over the past three years, often in competition with government-backed non-U.S. suppliers. Today, these companies are continuing to pursue a diversity of innovative approaches (including aircraft-launched rockets, solid/liquid hybrid engines, airbreathing propulsion and modular construction vehicles) that are expected to decrease launch costs by an additional 50% within several years.

#### Global Competition Emerges

The dramatic progress of the American small launch industry has clearly caught the attention of nations around the world. Orbital has certainly been a beneficiary as we celebrated our first international launch this February, when our Pegasus rocket successfully deployed a Brazilian environmental data collection and relay satellite into a precise low-Earth orbit. The experience of competing for the Brazil launch contract opened our eyes to the new, burgeoning competition in the world market for small rockets. For example, the field of competitors was joined by the Russians, as they put in a bid to employ their own launch vehicle. Although unsuccessful, this competition from Russia conveyed a very strong message: The former "friendly" space launch environment, dominated by the United States, is changing dramatically. Many other countries may soon be capable of launching small indigenous or foreign payloads from their own growing family of small launch vehicles. Such launcher programs are underway or under study in eight or ten other countries today. Let me assure you, Mr. Chairman, we in the small sector of the launch market do not fear fair competition. Quite the contrary, it is competition



that fosters the kind of technical innovation and cost-reducing measures that enhance us all. However, this new competition is not being played out on a level field. Many of these other countries either subsidize companies and/or products or operate in an environment where no fair pricing structure exists.

In our view, future progress -- and certainly continued innovation and cost reduction -- in our industry is synonymous with preserving this level playing field. Our market is by no means trivial in size or economic impact; for instance, the Brazil satellite launch I mentioned earlier was equivalent to the export of 1,000 mid-size automobiles in terms of jobs and balance of trade. Continued growth is expected on the "small" end of the spectrum, with the associated potential for technological innovation applicable to larger spacecraft. The growth and progress in small systems will continue only if the U.S. prevents foreign launch vehicles from being "dumped" on the small launch market. Such "dumping" in the form of non-market military missile assets or, or in our own backyard, U.S. excess ballistic missiles flies in the face of a decade-old national policy that encourages commercial investment in space systems. Some have argued that the entry of cheap Russian/CIS assets into the market will largely threaten the European launch industry and not our own. This may have been the case when the U.S. launch market was clearly dominant and significant restrictions were imposed on the launch of U.S. payloads on Russian launchers, but with U.S. satellites now sanctioned for launch on both the Russian Proton and the Chinese Long March, the landscape has changed. The Lockheed-Krunichev joint venture, Sea Launch Investors agreement and the tentative agreement between Motorola and Krunichev underscore the foreign competition problem. To date, "fair pricing" has not been defined in any of these arrangements. However, with wages for Russian engineers falling between \$15 and \$45 per month, even "real" cost determinations will still put prices significantly below U.S. systems. In Orbital's sector of the market, the opportunity for a potential customer to cheaply launch a satellite as a secondary payload on Proton may prove too attractive, despite the low cost of a Pegasus or Taurus launch.

### The U.S. Government's Contribution: Technology Partnerships

For small launch vehicles to achieve another three-fold reduction in cost-per-pound to orbit, advanced technology suitable to such vehicles must be developed over the next several years. In 1990, Pegasus achieved such an improvement compared to launches that were available in the mid-1980's as a result of an enormously productive partnership between the Advanced Research Projects Agency (ARPA) and the National Aeronautics and Space Administration (NASA) on the one hand, and Orbital and its industrial partner Hercules Aerospace Company, on the other. The Government acted as a reliable "anchor customer" and provided certain specialized facilities and equipment; the private sector designed, tested, built and operated the launch vehicle with its own capital. Today, market opportunities are available to repeat this very successful experience, although the technological challenge may be greater this time. As a result, the U.S. Government, through ARPA or NASA or perhaps both, should consider a modest R&D partnership program with industry to develop a new generation small launcher, and should become its first customer for flights beginning around 1997. The immediate return on investment of public funds would accrue from cost savings on government launches, supplemented by the even larger benefits of domestic market expansion and international market dominance for U.S. suppliers.

### Constructive Government Policies

As our trade negotiators press for concessions from our allies and former enemies alike, the United States needs to make sure its own house is in order. A U.S. policy which permits our strategic missile assets to be reused, for example, would send a message to the Russian government that anything they wish to do with their own assets, e.g. SS-18's and SSN-18's, is fine with us. The result, however, would be Russian refurbishment of their assets at artificially low or no costs and eventual sale on the open international market. U.S. industry would clearly be at a disadvantage. U.S. companies with access to strategic assets would be required to recover all refurbishment and other non-recurring costs and therefore could not compete on a price basis. Likewise, U.S. companies that can provide commercially available rockets would not be able to offer the same artificially low Russian prices. In either case, the U.S. would be self-inflicting a wound similar to that of the early 1980's

when U.S. policy decreed that all government payloads would be launched on the Shuttle, thereby taking the market out from under the U.S. expendable launch vehicle industry and allowing Arianespace to step into the void following the Challenger disaster.

### Missile Proliferation

Although beyond the legislative purview of this Subcommittee, there is a related issue that concerns all American citizens. I am speaking of the increased threat of global missile proliferation if Russian strategic missiles are allowed to be "dumped" on the international market as cheap launch vehicles. The greatest threat to international security would be the selling or bartering of missiles to third parties who might represent future threats to the U.S. and our allies. According to the 1992 publication Ballistic Missile Proliferation: An Emerging Threat, the openness of the free market enables third-world countries to purchase components, such as rocket motors and guidance systems, that otherwise would have taken years to develop independently. When combined with warhead technologies, developing countries could produce weapons of mass destruction. The INF Treaty called for destruction of missiles and warheads. Under START I, however, missiles will be retained. I urge the Congress and the Administration -- whether during consultations on START or oversight on trade talks -- to try to ensure these very significant issues are addressed.

### Export Financing

The launch of the Brazilian satellite in February was the first launch of a foreign payload for Pegasus, but certainly not its last. We anticipate international demand stimulated by flexibility and low cost of Pegasus to increase over the next few years. One of the attributes that makes the system unique and a major attraction for prospective foreign customers is the opportunity to purchase a totally deployable package: Pegasus, payload integration and testing, launch control, and air launch by our L-1011 aircraft. Under U.S. export law, when Pegasus deploys to foreign soil, our sale of launch services becomes an export and thereby eligible for export financing through the Export-Import Bank. If the foreign payload is launched from the U.S., as was the Brazilian payload, the sale is not defined as an export for purposes of export financing eligibility. What we would like to see is some consistency in the

rules of the road. Should the difference in launch venue drive the definition of the sale for export purposes? We believe the answer is no.

We need to reexamine the objective of U.S. Government sponsorship of inexpensive export financing. Broadly, that goal is the fostering of U.S. competitiveness overseas by affording foreign customers a financial incentive to purchase U.S. goods and services. This goal applies whether we or others seated on this panel launch a foreign payload from the Kennedy Space Center, Edwards Air Force Base or from an air strip in Europe or South America. Brazil's choice of Pegasus as the launch vehicle for its first satellite was by no means a *fait accompli*; others, including the Russians, were very much in the running. If the Brazilians had decided on Pegasus but required export financing to finalize their decision, EX-IM Bank financing would have been denied based on the U.S. venue of the launch. In the actual case, the foreign buyer chose the U.S. company anyway, but the point is that export financing would have been available had we launched the same payload from an airstrip in Brasilia. I believe the old adage applies: A duck is a duck, and an export is an export!

### Technology Transfer

One additional export issue for the Subcommittee to consider centers on technology transfer. In order to maximize our ability to compete internationally, we should be able to carry our technology to the customer. Orbital has that unique capability to transport our launch vehicle to a place of the customer's choosing and then launch from that site, on a short-term basis that would not facilitate foreign access to our technology. However, current technology transfer regulations impede the unique flexibility inherent in being able to fly to and launch from any location. I urge members of the Subcommittee to examine suitable measures that will protect against technology transfer while also promoting U.S. competitiveness overseas.

### Conclusion

Mr. Chairman, I recognize you share jurisdiction on these matters with other committees, but I believe now is the time to revisit these rules. As reflected by your dedicating a hearing to today's subject, the U.S. commercial launch industry is facing

great challenges from the emergence of competitors around the globe. No one is afraid of competition if the playing field is level, but such is not the case today.

### Recommendations

- (1.) In the spirit of the "partnership" nature of the U.S. Government's current sponsorship of technology investments, government and industry should jointly fund critical new technologies for small launch vehicles as well as larger ones. With industry as the market "driver," funds available for new technology investment through NASA and ARPA would result in major cost reductions and increased technological innovation. The associated cost structure advantage will stimulate demand for launch services and enable U.S. firms to compete much more effectively overseas while also providing a speedy return on public investment in the form of lower government launch costs.
- (2.) U.S. national space policy has encouraged development of a strong commercial launch industry. External and domestic threats to this strength must also be addressed at the national level. Our national leadership must send a clear message in its foreign and trade policies that protecting the U.S. share of the world's space launch market is a high national priority. Enforcement of reasonable "rules of the road" and fair pricing mechanisms for non-market entrants is key to the survival of this vital U.S. industry segment.
- (3.) The U.S. Government should encourage destruction of Russian/CIS excess ballistic missiles by offering to ban orbital reuse of U.S. excess ICBM's and SLBM's. The benefits would be elimination of a major threat to our commercial launch industry and a reduction in the threat of ballistic missile proliferation.
- (4.) Given increased competition in the international marketplace and the new "portability" of launch services, the U.S. Government should: (a) broaden application of export financing to include domestic launches of foreign payloads and (b) structure the application of technology transfer regulations to foster flexibility in competing overseas.

Mr. HALL. Thank you, Mr. Thompson.

The chair recognizes Mr. Zeger.

Mr. ZEGER. Good afternoon, Chairman Hall, Mr. Rohrabacher.

My name is Warren Zeger. I am vice president and general counsel of COMSAT Corporation, and I am very grateful to have the opportunity to testify before you today.

First, I need to briefly describe COMSAT and our view of the international launch vehicle market and our role in it and then discuss ways on how to assist U.S. industry, and in the course of my testimony I will offer our assessment, as a customer of spacecraft and as a customer of launch services, of the bilateral trade agreement described by Mr. Allgeier previously.

COMSAT Corporation, by an Act of Congress, serves as the United States participant to the highly successful International INTELSAT and INMARSAT organizations. We are the world leader in satellite circuit sales. We carry 50 percent of the international switch telephone traffic and data traffic and more than 80 percent of the video traffic to and from the United States. COMSAT is also the world's largest provider of satellite telecommunications to ships on the high seas, to commercial aircraft, and to land mobile users.

The two international organizations founded by COMSAT, and of which we are the largest owners and operators, INTELSAT and INMARSAT, are the world's largest customers for commercial satellites and launch vehicles. Since their inception, 50 satellites have been launched with an additional 14 satellites to be launched by 1996. COMSAT has been intimately involved with all the launch vehicle decisions made by both organizations. Our current launch vehicle choices include the Atlas, Delta, Ariane 4, the Russian Proton, and the Chinese Long March.

Now COMSAT has worked hard to deliver launch and satellite contracts to U.S. manufacturers. We take our obligation to represent and further U.S. interests very seriously and have worked with great success. For example, 71 percent of all INTELSAT and INMARSAT satellite contracts have gone to U.S. companies along with 58 percent of the launches, for a total of over \$4.4 billion—4.4 billion in real year dollars, which amount, if adjusted in today's dollars, would total a little under \$7 billion.

Increasing improvements in foreign launchers make the challenges to U.S. industry great. Evidence of the increasing worldwide competition is the variety of vehicles selected to launch our four INMARSAT 3 satellites. The first two satellites will be launched on the General Dynamics Atlas at a cost of \$124.4 million, and the third will be launched on the French Ariane 4 at a cost of \$61.6 million. The fourth satellite will be launched in 1995 on a Proton rocket.

As has been reported, INMARSAT and DB Salyut recently signed a contract which calls for the payment of \$36 million for the Proton launch. Additional costs need to be incurred and will be incurred that raise the final cost of the launch, and that cost is expected to reach \$46 million. One effect of the decision taken by INMARSAT will be to encourage greater use of the INMARSAT system which will strengthen trade links between Russia and the West.

As we have heard this morning, the United States and Russian Governments have reached a tentative bilateral agreement in prin-

ciple to allow the Russians into the international launch vehicle marketplace. Our assessment is that this trade agreement attempts to strike a careful balance between encouraging Russia's transition to a market-based economy and ensuring that the U.S. launch vehicle industry is not unduly supported or subjected to unfair competition.

We also believe that allowing Russia access to the commercial launch vehicle market enlarges the range of options for satellite operators, which is essential for the cost-effectiveness of their operations, and so overall we support the bilateral agreement. We urge, however, that it be administered flexibly and that its thrust and its focus be directed at protecting U.S. launch vehicle manufacturers and not Ariespace, which today holds a near monopoly position with respect to—at least a 60 percent position, with respect to launch vehicle supply.

Now where does this leave the U.S. launch vehicle industry? What should be done now and in the future to help the industry compete? We believe that the Federal Government must take an active role in helping to improve the competitiveness of the U.S. launch vehicle industry. An active role is investment in new technology and launch infrastructure in the U.S. and encouraging cooperative ventures between the Government and industry, and we note the recent joint venture proposed by some of the launch manufacturers with respect to planning and R&D, and they hope to involve NASA, and that type of venture is something that we think ought to be supported.

We do not believe an active role for the Government should entail building protectionist walls or suppressing the Russian economy that America wants to help rebuild. The technology on which the U.S. ELV's are based has been in existence for decades. Improvements will have to be made in the reliability and price of these vehicles if they are to continue to compete in the future. To achieve this, an entirely new launch system may be required, and if that new system is to be successful it must take into account the requirements of the commercial satellite industry and not just those of DOD and NASA.

If the U.S. is to retake the lead in providing commercial space transportation services in the next century, we believe that the development of an entirely new mode of space transportation will be necessary, and we think that promising technologies include the aerospace plane, NASP, and the single stage-to-orbit vehicle. These technologies have great potential to reduce launch costs significantly once the development costs are amortized.

COMSAT's access to affordable, reliable space transportation is essential to the continued growth and cost-effectiveness of international telecommunications services. Furthermore, the continued presence of a robust U.S. launch vehicle industry is key to maintaining a stable international and competitive international marketplace. The future of the U.S. launch vehicle industry depends on decisive action to invest in new technology and infrastructure.

Thank you very much. I'll be happy to take any questions you may have.

[The prepared statement of Mr. Zeger follows:]

Statement of

Warren Y. Zeger  
Vice President and General Counsel  
COMSAT Corporation

before the  
Subcommittee on Space  
of the  
Committee on Science, Space and Technology  
U.S. House of Representatives

May 19, 1993



Good afternoon Chairman Hall and Members of the Subcommittee,

My name is Warren Zeger, I am Vice President and General Counsel of COMSAT Corporation. I am pleased to testify on the issue of international launch vehicle competition and its impact on the U.S. launch vehicle industry, an issue in which we have a keen interest.

First, let me briefly describe COMSAT, our view of the international launch vehicle market, our role in it, and then discuss ways to assist U.S. industry.

More than thirty years ago President John F. Kennedy had a vision for the development of an international satellite network to bring modern communications to every corner of the globe. Out of this vision, COMSAT was born. Today, COMSAT Corporation serves as the U.S. Signatory to the highly successful international INTELSAT and Inmarsat organizations.

COMSAT is the world leader in satellite circuit sales, carrying 50 percent of the international switched voice and data traffic and more than 80% of the video to and from the U.S. Through our role as U.S. Signatory to INTELSAT, a 125 member organization, we access a system of 19 satellites providing telephone, data, video and facsimile

communications services to over 170 countries. We maintain a quality advantage over other satellite systems due to global coverage, reliability, superior technical service and use of high-powered satellites. Our major customers include AT&T, MCI, U.S. Sprint, the television networks, TBS/CNN and many others.

COMSAT also is the largest provider of telephone, telex, facsimile and data communications services to commercial and passenger ships, offshore oil rigs, yachts, airlines and land mobile customers. As U.S. Signatory to Inmarsat, which is made up of 67 member countries, we access a system that uses 11 satellites. COMSAT is the only signatory to offer global communications service to all four Inmarsat ocean regions. The U.S. government is one of our major customers with the U.S. Navy, U.S. Coast Guard, Department of State, NOAA, EPA and Armed Forces Radio and Television Service among the many agencies using our system. Inmarsat also provides the communications infrastructure for the Global Maritime Distress and Safety Service (GMDSS), and provides critical cockpit services to a growing number of commercial airlines.

Creation of these systems has spurred a rapid expansion in the commercial space sector. According to the Department of Commerce, revenues attributed to commercial space activity totaled \$5 billion in 1992, a 14% increase over 1991. Commercial satellite sales accounted for \$1.5 billion, commercial launch vehicles, \$500 million, earth stations, \$1.7 billion and satellite services, \$1.5 billion.

INTELSAT and Inmarsat are the world's largest customers for commercial satellites and launch vehicles. Since their inception, 50 satellites have been launched with an additional 14 to be launched by 1996. COMSAT has been intimately involved with all launch vehicle decisions made by both organizations, and we continue to have a vital interest in the availability, reliability and cost of the launch vehicle options for our future operations.

INTELSAT and Inmarsat base their launch vehicle procurement decisions on fair criteria that rely for the most part on business principles. Generally, these criteria include reliability, price, launch schedule, availability of launch insurance and of course technical compatibility with the spacecraft.

Considering the size and weight of our satellites, the available launch vehicle choices include Atlas, Delta, Ariane 4, and to a lesser extent Russian Proton and Chinese Long March. As they become commercially operational by 1997, the Ariane 5 and Japanese developed H II will provide additional launch options.

Historically, COMSAT has worked hard to deliver launch and satellite contracts to U.S. manufacturers when they have come forward with commercially competitive bids. For example, 71 percent of all INTELSAT and Inmarsat satellite contracts have gone to U.S. companies, along with 58 percent of the launches for a total of

over \$4.4 billion. Companies such as General Dynamics, McDonnell Douglas, Space Systems/Loral, Hughes Aircraft and Martin-Marietta Astro have directly benefited from this effort.

Based on recent history, U.S. launchers will continue to secure a sizable share of the INTELSAT and Inmarsat launch contracts. However, increasing improvements in foreign launchers make the challenges to U.S. industry even greater. The rest of the world, particularly the government-funded European Space Agency (ESA), will continue to aggressively pursue improvements in their Expendable Launch Vehicle (ELV) systems, such as the development of Ariane 5. These improvements are expected to lead to lower costs and greater efficiency. While acceptance of these vehicles will depend on a track record of reliability, they are expected to be formidable competitors in the long term. Add to this the availability of the Russian Proton and Chinese Long March rockets and you have a highly competitive marketplace.

Evidence of this competition is the variety of vehicles selected to launch the four Inmarsat III satellites. The first two satellites will be launched on Atlas at a cost of \$124.4 million and the third will be launched on Ariane 4 at a cost of \$61.6 million.

The fourth satellite will be launched in 1995 on a Proton rocket. As has been reported, Inmarsat and DB Salyut recently signed a contract which calls for the payment of \$36 million for the Proton launch. Additional costs will be incurred to pay for needed modifications to the satellite, political risk insurance, as well as a policy to insure against launch failure. The final cost of the launch is expected to reach \$46 million. Virtually all transfer of funds under the contract have been made contingent on agreement being reached between the U.S., Russia and Khazakstan on technology safeguards. We are committed to working with Inmarsat and Martin-Marietta Astro to provide any assistance on the technology safeguards program once it is developed to ensure complete security for the satellite.

This decision was made after careful consideration of available launch vehicles, reliability, price and launch schedules. It is important to note, the former Soviet Union was a charter member of Inmarsat when it was created in 1978. Furthermore, Russia and the CIS remain active participants, providing hard currency as contributions to the organization's operations. One effect of the decision will be to encourage greater Russian use of the Inmarsat system which will strengthen trade links between Russia and the West.

The contract was made possible by a Bush Administration decision last year to allow a "single exception" launch on Proton. The decision kept intact U.S. policy restricting the export of U.S. built satellites to Russia, while allowing the U.S. to test the waters during bilateral negotiations over market entrance.

Since that time, it is our understanding that the United States and Russian governments have reached agreement in principle to allow the Russians into the international launch vehicle marketplace. This trade agreement attempts to strike a careful balance between encouraging Russia's transition to a market-based economy and ensuring that the U.S. launch vehicle industry is not subject to unfair competition. Allowing Russian access to the commercial launch vehicle market serves the goal of enlarging the range of options for satellite operators, which is essential to the cost-effectiveness of their operations.

INTELSAT currently has ten pending contracts for launch services for its INTELSAT VII, VIIA and VIII satellites. Included in these is one conditional contract with China Great Wall Industry Corp. for the launch of the third INTELSAT VIIA satellite on a Long March rocket. The launch, which will cost \$56 million, is scheduled for October, 1995. The contract is conditioned on the granting of all required licenses and approvals for export of the spacecraft for launch from China and the exchange of technical information as well as assurances that acceptable launch insurance can be obtained.

Where does this leave the U.S. launch vehicle industry? What should be done now and in the future to help the industry compete?

If no action is taken, the U.S. commercial launch market share will decrease over time in the face of increased foreign government investment, particularly the Europeans and the Japanese. This is not only bad for the U.S. launch industry but for those using launch services since they rely on a competitive market to ensure high reliability and reasonable price.

We believe the Federal Government must take an active role in helping to improve the competitiveness of the U.S. launch vehicle industry. An active role is investment in new technology and launch infrastructure in the U.S. and encouraging cooperative ventures between the government and industry. An active role is not building protectionist walls or suppressing the Russian economy that America wants to help rebuild.

The technology on which the U.S. ELVs are based has been in existence for decades. Improvements will have to be made in the reliability and price of these vehicles if they are to continue to compete in the future. To achieve these requisite capabilities, an entirely new launch system may be required. If this new system is to be successful, however, it must take into account the requirements of the commercial satellite industry and not just those of DoD and NASA.

For this reason, we strongly support the efforts by Boeing, General Dynamics, Lockheed and others to revive planning for the next generation launch vehicle. This effort is an excellent example of a government-industry partnership which is customer-driven.

If the U.S. is to retake the lead in providing commercial space transportation services in the next century, we believe the development of an entirely new mode of space transportation will be necessary. Promising technologies include aerospace planes and single-stage-to-orbit vehicles. These technologies have the potential to reduce launch costs significantly, once the initial development costs are amortized.

COMSAT's access to affordable, reliable space transportation is essential to the continued growth and cost effectiveness of our international telecommunications services. Furthermore, the continued presence of a robust U.S. launch vehicle industry is important to maintain a stable international marketplace through the availability of multiple launch systems. The future of the U.S. launch vehicle industry depends on decisive action to invest in new technology and infrastructure. We look forward to working with the Subcommittee in this effort.

I will be happy to respond to any questions you may have.



Mr. HALL. I thank you, and the chair recognizes Mr. Hollis.

Mr. HOLLIS. Thank you, Mr. Chairman.

On behalf of Space Systems/Loral and Loral Corporation, I am pleased to have the opportunity to present our views on international competition in launch services.

Space Systems/Loral was the spacecraft manufacturing division of Ford Aerospace prior to its acquisition by Loral Corporation in 1990. We have manufactured satellites for over 30 years and led the world in their export for much of that time. For Intel alone, we have delivered 15 spacecraft of an earlier generation, of which 13 were successfully launched and, I might add, are still operating. Nine of a later generation are currently in various states of completion, with the first to be launched in October. Loral's contribution to the leading role the United States occupies in space commerce has been significant, as has its contribution to the positive balance of payments. We also have manufactured a great number of satellites for Japan. Our focus has primarily been in the international market.

Unfortunately, during this same period the role of the U.S. launch industry has eroded from a position of sole provider to the Western World to that of a distant second. Arianespace has been extremely successful in competition with U.S. firms, taking the majority of the recent commercial awards. Exceptions generally involve a customer with multiple launch requirements who is concerned about placing all of his orders with one launch provider.

My testimony is that of a spacecraft manufacturer that depends on a reliable and cost-effective, cost-competitive launch vehicle. In an era where the cost of transportation to space is often equal or exceeds that of the cost of the payload itself, the launch vehicle selected may well make the difference between winning and losing a contract or being competitive in a satellite-based service. Now I add the last because a new role for Space Systems/Loral is that of a service provider, and we are now planning that.

Mention has been made of Iridium. I would like to say a couple of words about Globalstar. Loral is in partnership with Qualcomm and plans to provide a mobile communications service called Globalstar. With a fleet of 48 satellites, Globalstar will make it possible to communicate to and from most any place on Earth using hand-held transceivers. Multiple launches will be required for this service, representing a significant part of the cost investment—of the capital investment we will be required to make.

There will still be competition from other providers of this mobile satellite service as well which could include a recently announced Russian service called Signal. The availability of low-cost launch vehicles and the amount paid for space transportation could be a major factor in our ability to compete with our mobile satellite service.

A spacecraft manufacturer which has access to low-cost launch vehicles that is not available to others competing in that area could have an overwhelming advantage. This has been and continues to be a matter of concern as it relates to the launch vehicles of Russia as well as now those of China.

Loral supports the position that the United States should have a strong commercial launch capability. However, we see no plan on

the horizon that will enable U.S. firms to become competitive. In fact, the opposite is true. If Europeans are able to make good on their stated objective of a 20 to 25 percent decrease in the launch costs with the Ariane 5 when it becomes operational, this would result in prices generally in the range of some of those quoted by the Chinese and Russians, a highly beneficial development to the spacecraft manufacturers, but making it increasingly difficult for the U.S. launch providers. These launch providers, as has been stated frequently this afternoon, are saddled with decades-old technology.

It is my personal view that it is too late for the United States to rely on an evolutionary improvement schedule in conventional launch technology as a means of regaining a competitive edge in space transportation. We are currently years behind, and significant improvements would not become available before the turn of the century. A revolutionary approach is required in technology as well as incorporation between the Government and industry.

A recent announcement of Lockheed's work on the aeroballistic rocket was encouraging as was an indication of the formation of an alliance between U.S. firms traditionally associated with space transportation.

Whether evolutionary or revolutionary, the development and production of our next generation of launch vehicles should be a team effort between Government and industry. No individual corporation, even though working with the Government, is likely to assume a major share of the risk associated with development of a new generation of launch vehicles.

Perhaps a semi-public corporation jointly held by several companies and free of the antitrust concerns could be the proper course to work with the Government to provide space transportation for the 21st century. We should take note and learn from the success of the Ariane space program. In our own country, we have seen the success of the Communications Satellite Corporation, which we just heard from, a commercial enterprise that has flourished as a successful example of a special relationship between Government and industry.

Three additional ingredients to this mix may be required for U.S. firms to regain a competitive edge: A substantial Government procurement of launch services; removable of uninsured-able risk; and a successful commercial strategy built on that same production line, and when I say uninsurable risk, I am thinking about from commercial businesses. We believe the first two of these can be assisted by Government policy; the third depends on private industry.

In closing, I want to return to the competitive situation we face today. Arianespace is clearly the leader in space transportation, and there are strong indications their competitive advantage will increase with the introduction of the Ariane 5. Trade policy implemented to protect U.S. launch firms may provide an even greater benefit to Arianespace because of their larger share of the market.

It is our belief that additional competition for space launch opportunities should be permitted through fair and enforceable agreements with China, Russia, and possibly the Ukraine, but, as a minimum condition, U.S. spacecraft manufacturers should not be de-

nied access to any launch vehicle that is available to its international competitors.

Thank you.

[The prepared statement of Mr. Hollis follows:]

TESTIMONY OF  
Mr. Rex R. Hollis  
Vice President, Policy and Plans  
SPACE SYSTEMS/LORAL

BEFORE THE SUBCOMMITTEE ON SPACE  
HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

MAY 19, 1993

Mr. Chairman, Members of the Subcommittee:

On behalf of Space Systems/Loral (SS/L), and Loral Corporation, I am pleased to have the opportunity to present our views on International Competition in Launch Services. SS/L was the spacecraft manufacturing division of Ford Aerospace prior to its acquisition by Loral Corporation in 1990.

We have manufactured satellites for over 30 years and led the world in their export for much of that period. Loral has made a significant contribution to the leadership role the U.S. industry has maintained in manufacturing of communications satellites, and to the associated positive balance of payments. For example, we manufactured the first three-axis stabilized satellites used by Intelsat, delivered 15, and are in various stages of completion for nine additional spacecraft that represent the leading edge of technology. Four sophisticated satellites were manufactured and launched for the Space Communications Corporation of Japan within the recent past, and two are nearing completion for the Nippon Telephone and Telegraph Company.

Unlike the U.S. leadership in spacecraft manufacturing, unfortunately, the role of the U.S. launch industry has eroded from a position of sole provider in the western world to a distant second, with questionable staying power but for the captive launch market of the U.S. Government. Unfortunately, there has been a divergence of the fortunes of the U.S. spacecraft and launch services industries.

My testimony is that of a spacecraft manufacturer who depends on reliable and cost competitive launch vehicles. In an era when the cost of transportation to space is often equal to or exceeds the cost of the spacecraft to be launched, selection of the launch vehicle may well dictate the selection of the spacecraft, and, therefore, the spacecraft manufacturer. Accordingly, access to and selection of reliable, low cost space transportation has become one of the most crucial considerations in any business competition for spacecraft manufacturing opportunities.

Satellite operators who are considering purchase of a spacecraft are concerned with the total cost of an on-orbit and operating spacecraft. The division of cost between the spacecraft and launch vehicle is little more than a matter of intellectual curiosity. While the spacecraft manufacturer alone can control the cost of the satellite, our industry must rely largely upon government policy to ensure access to the most cost effective space transportation, whoever the provider might be. For these reasons, and in light of the rapidly changing political situation internationally, these hearings are most timely.

Loral supports the position that the United States should have a strong commercial launch capability. To remain competitive internationally, we also believe strongly that U.S. spacecraft manufacturers must have access to any launch vehicle available to our free-world competitors. As a result of realities of the competitive environment for launch opportunities today, we believe that trade agreements should be executed for launch activities, but driven more by good commercial practices than strategic or political consideration. For example, we continue to be opposed to the dumping of launch vehicles from the strategic reserve of any nation into the commercial market.

#### **The Current Competitive Situation for U.S. Launch Providers**

Arianespace has been extremely successful in competing with U.S. launch firms. In fact the unfortunate reality is that U.S. firms are only barely competitive for most commercial launch opportunities, and this fact should be recognized in the formation of national policy on the issue. Generally speaking, U.S. launch firms now obtain a commercial launch contract only when multiple launches with one customer are involved, and the customer is concerned about placing all orders with a single launch provider.

The fortunes of the U.S. launch providers will encounter further difficulty when the Ariane V becomes operational if the Europeans are able to make good on their stated objective of a 20-25% reduction in the cost per kilogram with that vehicle. This would result in launch prices generally in the range of some of those quoted by the Chinese and Russians, a highly beneficial development for spacecraft manufacturers and their customers, but a difficult situation for U.S. launch firms using decades old technology.

In the expected absence of near-term, significant progress on a new, efficient U.S. launch vehicle, it is a practical fact that U.S. launch providers can not compete with Arianespace through the remainder of the twentieth century without some form of subsidy from the U.S. Government. There is growing danger that this condition will continue well into the 21st century, with no indication that the U.S. Government or private industry is taking steps that could change it. While commendable steps have been taken by private companies in developing launch vehicles for small spacecraft, development costs of a modern, efficient launch vehicle capable of competing with the Ariane V exceed what could reasonably be expected from any commercial corporation. Likewise, with Federal budget constraints and the absence of a strategic threat, it is politically difficult for the Government to justify funding such an undertaking.

There has been a great deal of discussion of programs such as the National Launch System, the National Aerospace Plane (NASP), and Spacelifter. No significant consensus or progress has been made on development of the next generation of space transportation that could cost billions of dollars and span a decade or more. Hence, there is no obvious light at the end of the tunnel for the U.S. commercial launch industry. Limited opportunities for launch of U.S. Government payloads will continue to exist for U.S. launch providers due to the likely denial to foreign entities of those launches.

**A Long Range Plan for U.S. Commercial Transportation**

A task force headed by former Air Force Secretary Aldridge found that the majority of the space launch requirements of government and commercial space missions could be satisfied with a vehicle having a performance range of 20,000 to 50,000 pounds to low earth orbit. This has been described by some as the NLS program under a new name. The question exists whether the United States should undertake a costly, evolutionary project that will not be operational for many years. Would the Spacelifter, for example, be competitive with Ariane V if it were developed, and would it satisfy our space transportation requirements 10 to 20 years in the future?

It is my personal view that it is highly questionable whether an evolutionary approach would be sufficient to restore our commercial competitiveness. Alternatively, we could envision a leap-frog, revolutionary approach.

Consider the example of HDTV development in this country. Recognizing we were several years behind Japan in program definition, through a bold initiative, the U.S. has moved into the HDTV lead technologically by adopting a revolutionary systems approach. This effort could restore the country to a leadership role in TV manufacturing. Perhaps world conditions, politically as well as commercially, present an opportunity for the U.S. to take a revolutionary approach to the provision of future space transportation. We are the sole military super power, but have lost our competitive edge in the commercial launch market. If we were to pursue a leap-frog initiative, we could continue to rely on the old but operable space transportation, which is satisfactory for the majority of our near-term requirements. Access to the heavy lift ability of Russia and Arianespace also could be called upon if required.



Whether evolutionary or revolutionary, the development and production of our next generation of launch vehicles should be a team effort between government and industry. We should take note of and learn from the success of the Arianespace program. In our own country we have seen the success of the Communications Satellite Corporation (COMSAT), a commercial enterprise that has flourished as a successful example of a special relationship between government and industry. No individual corporation, even though working with government, is likely to assume a major share of the risk associated with development of a new generation of launch vehicles. Perhaps a semi-public corporation, jointly held by several companies and free of anti-trust concerns, could be the proper course to work with government to provide space transportation for the 21st century.

#### **Future for U.S. Spacecraft Manufacturers**

The existence of competition now and in the future for launch vehicles is highly beneficial to the spacecraft industry, satellite operators, and to consumers. To maintain this competition after introduction of the Ariane V, as well as for numerous other reasons, it is highly desirable that fair and enforceable trade agreements with the Chinese and Russians be executed in the near future.

The entry of the Russians into the commercial marketplace is very significant now that they have also entered from the spacecraft side.

The recent award of a contract by Rimsat (a U.S. owned, offshore company) for delivery on orbit of Russia's Gorizont satellites over the Pacific is a precursor of future competition from the former Soviet Union. Rimsat has announced that the relatively primitive Gorizonts will be replaced by more technically advanced Express (Russian) satellites in the near future, advancing the competitiveness of Russia to a significant level. While still technically

behind Western technology, the on-orbit price of the Express can be very attractive because of the relatively low cost of its transportation to space. With cost of space transportation such a large part of the total, a competitive spacecraft alone is no longer sufficient to ensure an award.

You may be familiar with the announced plans of Loral Corporation and Qualcomm, Inc. to provide a mobile communications service called Globalstar. Using a fleet of 48 satellites, Globalstar will make it possible to communicate to and from most any place on earth, using small, hand-held transceivers. Multiple launches will be required for the service, representing a significant part of the total capital investment. There will be stiff competition from multiple providers of the service, which could include a recently announced Russian entry called Signal.

This example illustrates the dynamic nature of the commercial spacecraft business. There are new entrants and new relationships formed all the time. For U.S. spacecraft manufacturers to maintain their leadership and contribution to balance of payments, we will need a policy that assures equal access to the most cost effective launch services available worldwide.

Mr. Chairman, members of the Committee, this completes my prepared statement.

Mr. HALL. Well, we thank you.

# STRATEGIES AND TACTICS OF U.S. LAUNCH COMPETITION

Mr. HALL. I guess before we launch into some questions with Mr. Brashears who has to leave first—I mean Mr. Dorfman—I will give Mr. Brashears a chance to have equal time with Mr. Kehlet, who took exception to some of your testimony.

Do you want to cross swords on that?—have a little excitement up here.

Mr. BRASHEARS. As we stated earlier, I think we find a lot of common ground with respect to what not only was said in opening testimony but what was said here. We may agree—excuse me—we may disagree a little on some of the strategies and tactics to do it, and, as he stated, the separation of what the U.S. Government does as a buyer and what we do for commercial applications seems to Lockheed to be a reasonable separation, and the subject today is what to do with international commercial competition. That piece of it I believe we find a lot of common ground here, and including the fact, as we referred to, the quantitative data that backed up some of the opening statements. We find ourselves where the U.S. industry and Government needs to partner against this monopolistic situation that exists with the French.

We at Lockheed would not have embarked on this Russian venture had we had alternative ways to deal with this monopoly that exists. So, as a last resort, to protect our satellite interests and the associated ground systems and operations—which, again, is 91 percent of space commerce—we embarked on this venture under the theories well stated around this table that competition in international space commerce will produce a growth market, particularly at low Earth orbit, and to compete internationally we cannot keep international launchers away from U.S. satellite builders.

Imagine the situation if some other country embarked on the partnership with Russia that Lockheed stepped up to. In fact, imagine the situation if Ariane and the Russians got together on this situation. What we have done is invested to secure a U.S. interest in this transition period to bring world class competition to this monopoly under the theory that space commerce will grow, thereby making more launches available to not only the international launch community but also the U.S. launch community, and we have separate approaches with the USTR agreements for what occurs at GEO and what will occur in the expanding LEO market.

Mr. DORFMAN. Mr. Chairman, may I add to that comment?

Mr. HALL. Yes, please do, Mr. Dorfman.

Mr. DORFMAN. I happen to side with Mr. Brashears on the point that also Mr. Rohrabacher made right at the beginning, and that is, satellite communications, like all communications, is an elastic market, which means the lower the cost, the more people that are going to use it. So if we can reduce the cost of satellite communications through reduced cost of launching, there will be more applications, there will be more users, there will be more launches.

I deeply believe that, and there is plenty of evidence in addition to the case that Mr. Brashears was making, and that is one of the reasons why I feel that a contribution of foreign launch providers

will be to reduce the cost under quota considerations that will open and enable new applications like the one that Lockheed is pursuing with Iridium, and there will be others also, and that is why I mentioned in my brief statement that I feel that the quotas themselves are enough to protect the U.S. ELV industry in a transition and I don't feel that an arbitrary pricing constraint is useful or more helpful in helping the U.S. ELV industry. In fact, it hurts in not permitting some low-cost new applications to develop.

Mr. HALL. Mr. Kehlet?

Mr. KEHLET. Yes, I think I would like to clarify what my exception was, and I may take slight issue even with my colleague, Mr. Dorfman.

Several companies have looked at the market. Now the rationale used is that by the year 2000 in the geosynch orbits—right now, their satellites are spread about 2 degrees apart; 2 degrees divided into 360 gives you 180 satellites, and we are almost there now, and certainly by the year 2000 all those slots will be filled.

So unless we have some technology improvements in the satellites whereby we can reduce that band width, we are going to end up with replacement satellites only of what is there, and that is estimated to be about 10 a year.

In the case of the mobile low-Earth-orbit satellites, Iridium should be in place at that time and several of the other satellites, and that too would be primarily a replacement market, and it is on that basis that we look at it from a standpoint of a fairly inelastic market, particularly in the geosynch satellites, and therefore we don't see a big market come up.

We would be very interested, and hope to be proved wrong, that the market indeed is elastic and not as inelastic as we have predicted. Now when I say we, it was made up of a team of people, launch vehicle providers, and this was both at COMSTAC and the NSIA Committee, looking at the mission model. We projected a mission model from the year 1992 all the way out to the year 2010, and we just don't see the satellite market increasing that much.

Now, if indeed the market is elastic, as Mr. Dorfman says, perhaps there's more transponders in an individual satellite as opposed to more satellites, but, be that as it may, we, in the long run, feel that world competition is good. I think any competition we have will benefit all of the industry and keep us on our toes to reduce cost. In the interim, though, we feel the so-called protectionism is required just to keep the level playing field going until these nonmarket economies become somewhat more market oriented.

So it was on that basis that I made my comment both about the size of the market as well as the so-called protectionism.

Mr. HALL. Mr. Wynne is wrestling around.

Did you have anything you wanted to add to that or comment on their comments?

Mr. WYNNE. The only thing I would like to add, Mr. Chairman, is, I note with some interest the slope of the line and the escape of the market because they are both about the same slope in the sense that America used to have the technology lead in launch vehicles, and that is what really led to the advance and technology lead in satellites. The real marketplace, which is about twice as much as the cost—of the additive cost of satellites and launch vehi-

cles is in the provision of services and dominates the communications satellite total market.

I note with interest that as we let our launch vehicle erode and our technology lead in launch vehicle erode, we are losing a similar share of the communications satellite market. Maybe this is some evidence that if you let one technology segment erode you begin to get erosion in the second, and possibly in the third, which is the larger of the three.

Thank you.

Mr. HALL. I recognize Mr. Rohrabacher, he may have a question, but we have just a short time.

Mr. ROHRABACHER. We have got just a couple of seconds, but for sure—one thing is for certain as far as that last comment. If we artificially raise the price of our satellites by making sure that they cost more to put them up, getting them there, we are going to lose that market, and we are way ahead of that right now. We cannot afford to let that happen, and the bottom line is, we have got a healthy satellite business, and in order to save our launch business we are not going to halt—we are not going to bring down our satellite business. That is going to require a lot of expansion on that comment, and when we come back maybe we can get into that, but I know Mr. Dorfman has got to leave.

Just one note, because we are going to leave in a minute and you probably won't be here when we get back, but when you mentioned earlier about the U.S.S.R. as a provider and China as a consumer as well as a provider—and I believe that was your observation—China right now, I believe, is a consumer because it has lots of credits. It borrows money in order to be a consumer. Isn't that right?

Mr. DORFMAN. The situation with China is, they have a very rapidly developing economy, unlike Russia, which is going the other way insofar as their economy is concerned, as we all know. To make that economy work, they need communications infrastructure, Mr. Rohrabacher.

Mr. ROHRABACHER. Right, but they are building it based on credit and—

Mr. DORFMAN. No. The Chinese have a major dollar—they have loads of cash.

Mr. ROHRABACHER. Okay. I stand corrected.

Mr. DORFMAN. The cash is coming from two directions. One is from us, because we have an \$18 billion trade deficit as we buy Chinese shoes, clothes, et cetera.

Mr. ROHRABACHER. Correct.

Mr. DORFMAN. And the other source of cash is through Taiwan and Hong Kong, where there's loads of investment going into China to build up their infrastructure.

Mr. ROHRABACHER. Yes.

Mr. DORFMAN. Now infrastructure means they need satellites.

Mr. ROHRABACHER. Correct.

Mr. DORFMAN. And that is what we are doing is, we are selling them satellites. They are launched on Chinese launch vehicles.

Mr. ROHRABACHER. None of that conflicts with the central point that I wanted to make to you, and that is, I think that within five years, once Russia gets its act together, it is going to be in the

same situation. It is going to need our help for infrastructure, and the inelastic demand that you see, that McDonnell Douglas may or may not see, there is a potential there in the Soviet Union as great as there is in China, especially if we are working with them, especially if we are in the inside, and I think we have to go vote, Mr. Chairman.

Mr. DORFMAN. I hope you are right.

Mr. HALL. The chair wants to recognize the presence of Mr. Royce.

Mr. ROYCE. Thank you, Mr. Chairman. No questions at this point.

Mr. HALL. I really believe that we have held this panel up enough.

Mr. ROHRABACHER. I guess so.

I will come back and talk to you when it is over. I would like to to talk to some of you fellows about this afterwards. We don't have to be on the record; that is fine with me.

Mr. HALL. I think we will—well, is it all right with you if we adjourn?

Mr. ROHRABACHER. That is fine. If anybody has got time enough to stay after, I would love to—

Mr. BRASHEARS. We would be pleased to stay.

Mr. ROHRABACHER. Good. I'll see you then.

Mr. HALL. All right. As many can, stay, and we thank you for your time. Sorry. This is the first hearing that we have been dashed up like this, and we don't know what is ahead, so I'm going to turn everybody loose, and we will be adjourned. I thank you very much for your time and for your testimony; it has been very good.

Mr. DORFMAN. We feel like we have been on a tag team wrestling match.

[Whereupon, at 4:42 p.m., the subcommittee was adjourned.]

APPENDIX

## Written Questions for Mr. Allgeier

1. In your testimony, you outlined the United States' new launch services trade agreement with the Russians.
  - a. To your knowledge, are any of the "contracts" provided for by the agreement under negotiation now, between any U.S. and Russian parties?

A: The launch of the INMARSAT 3 and the three Iridium launches specifically referred to in the agreement are presumably under negotiation or agreed. Lockheed and the Russians also sought to compete for the launch of the Indonesian Palapa C satellite. That would have come under the agreement, had they secured the contract. INTELSAT is also considering bids on a number of launch contracts for the future. Beyond these cases, I am not aware of negotiations for specific launches pursuant to the agreement.
  - i. What do think the chances are that the Russians will sell all eight "contracts?"

A: I do not think it would be useful for me to make predictions of that sort. The agreement will provide Russia the opportunity to compete for satellite launch services. Its ability to win any or all of the eight contracts provided for in the agreement will depend upon the quality of the Russian product, the reliability of the vehicle and the associated launch services as well as the effectiveness of its marketing package. All of these are factors are untested in a commercial marketplace and only time will demonstrate how well Russia adapts to these entirely new commercial realities.
  - ii. Is it permissible for a single buyer to contract for all eight of the launch contracts?

A: Yes, but all provisions of the agreement would still apply.
2. Tell us why you believe reaching this agreement is important to the United States...

A: The United States has wrestled with the question of "commercial" competition in space launch services for a number of years. The unique characteristics of the market, and historic role of governments suggest a special relationship with traditional rules of international trade. The Russian agreement endorses a number of important principles of conduct for governments which we believe are appropriate standards for all participants in this industry.

While establishing these important principles for the longer term functioning of the international commercial space launch market, the agreement also sets out a practical mechanism for Russia's entry into this market during its transition to a market economy, before reform can make those principles fully applicable. It will help ensure that Russia's entry into the commercial space launch market is orderly and does not disrupt normal competition in this important sector.

It will also encourage economic reform in Russia and in the Russian space launch industry in particular. It should encourage an important part of the Russian military-industrial complex to adapt itself to civilian markets. Finally, it will make additional supply and choice available to consumers of commercial launch services in the United States.

a. Will it make the world safer? How?

A: Yes. It will help economic reform and provide a source of hard currency that will help to stabilize the situation in Russia. It will encourage the space launch component of the Russian defense industries to turn their energies to peaceful pursuits. It will also maintain stability and employment for the highly skilled technicians and scientists of the Russian industry, who might otherwise be sought out by countries such as Iran and Libya seeking to acquire missile and space capabilities.

b. How does it help US industry deal with the effects of ending the Cold War and transitioning to a post-Cold War economy?

A: The agreement will help the US space launch industry adapt to post-Cold War conditions by providing a stable and predictable framework for Russian entry into the commercial space launch market. At the same time, it provides the US satellite industry with access to Russian launch capabilities, thus avoiding broad restrictions that might put them at a commercial disadvantage.

3. Some members of the launch vehicle family say the US launch services trade agreement in place with China is a failure. That is, it does not level the playing field between non-market and market-based pricing.

a. In what ways is the agreement with the Russians an improvement on our 1989 agreement with China?

i. Describe the agreement's provisions from the standpoints of predatory pricing and dumping practices.

ii. What does this agreement have that the China



agreement did not?

A: China's pricing practices under the 1989 U.S.-China MOA have been a cause of concern in the US government. We have tried to address this problem in the Russian agreement. The Russian agreement will require Russia to charge prices "similar to" those charged by Western launch providers for comparable services. This provision is much like the "on a par with" mechanism in the China agreement. In addition, we have added a provision that would automatically trigger consultations with Russians if a Russian bid on a contract is more than 7.5 percent below the lowest Western bid for GEO launches. The Russians would have to explain and justify the lower price in those consultations. We believe that with this additional clarity we can avoid the difficulties we have encountered under the China agreement.

4. What exactly are the United States' obligations under the launch services trade agreement with Russia?

A: The specific obligations undertaken by the United States in the agreement are to consult with the Russians on a regular basis and in response to specific requests, to negotiate the necessary technology safeguards arrangements to permit launches under the agreement of satellites incorporating technology subject to US export controls, to consider on a case-by-case basis Russian proposal for other launches to low-earth orbit if that market develops further and to comply with general "rules of the road" provisions on fair competition and corrupt business practices. The agreement does not impose any obligations that would conflict with US laws or regulations.

a. Does the US government guarantee anything to the Russians?

A: No.

b. What promises are made with respect to market share or future agreements?

A: There are no commitments on market share or future agreements. The opportunities offered under the agreement are just that: opportunities to compete, not guaranteed contracts.

5. The Subcommittee recognizes that many of the benefits from reaching such an agreement on launch services with Russia will go much farther than space policy per se.

a. Specifically, what are the potential benefits to the American people from reaching this agreement?

A: This agreement will have many diverse benefits for the American people. It will encourage and support economic reform in the Russian space launch industry and the Russian economy as a whole. It will provide a significant source of hard currency income for the Russian economy. It will encourage the adaptation of a key defense industry to peaceful uses and discourage them from reverting to their past ways. It will provide the highly successful US satellite industry with a new and economical source of launch services.

b. How is the security of the United States enhanced by a space trade relationship with Russia?

A: There are two key security benefits to the United States in this space launch agreement. First, it gives to an important defense industry a strong incentive to adapt itself to peaceful operation and to transfer resources from military to civilian applications. Second, it helps to maintain industrial and employment stability for scientists and engineers who might otherwise be attracted to missile and space programs outside Russia, leading to proliferation in unstable regions of the world.

6. We understand that Russia's economic behavior relative to commercial space launch is regulated by this agreement. That's the whole idea of trade agreements.

a. But, are US obligations under this agreement in any way linked to the future political behavior of Russia?

i. Does anything happen under the agreement if, let's say, Russia suddenly stopped allowing Jews to emigrate to Israel?

A: No. The agreement does not have any provisions related to emigration. It does, however, preserve the effects of other US laws.

ii. From an official standpoint, Russia now lets Jewish people leave if other countries will accept them. From the practical point of view, leaving Russia for good is made as hard on would-be emigrants as possible. Does this agreement have any impact on the lives of these people? If so, how?

A: The agreement does not address the issues of emigration or the treatment of would-be emigrants. By encouraging economic reforms in the space sector and the economy as a whole, however, it has the potential to benefit all

*Russians, including would-be emigrants.*

- b. To what degree does this agreement reflect Russia's adherence to the Missile Technology Control Regime?

- i. Have the Russians agreed to be bound by the MTCR?

A: *Questions on Russian adherence to the MTCR are outside the responsibilities of the Trade Representative and should be directed to the State Department.*

- ii. Was the Russians' adherence to MTCR a factor in the timing of the talks that led to this agreement?

A: *See above.*

- iii. Does this agreement give the United States added leverage with the Russians in achieving adherence to MTCR and other nonproliferation accords?

A: *Obviously, this agreement is an incentive to Russia not to violate international standards on proliferation and risk sanctions that would make it impossible for them to continue launches under the agreement.*

7. In what ways is the launch services trade agreement with China an instrument of US foreign policy?

- a. Toward the end of the Bush Administration, the President approved export license for US-made satellites to China, presumably under the terms of the 1989 agreement with the Chinese. Some people think that sort of last-minute approval was made to balance another last-minute decision to sell F-16 fighter planes to Taiwan. What do you think happened?

A: *USTR is not involved in export licensing decision, so I would again refer you to the State Department.*

- b. Was the export approval related in any way to an earlier decision of the Bush Administration to sell F-16 fighter planes to Taiwan?

A: *I do not know.*

- c. In terms of attempting to make a gesture of good faith, is the new agreement with Russia any different from the Chinese agreement? If not, why not?

A: *We believe the US-Russia space launch agreement is a good one from which both sides can benefit. There are a number of differences between our*

agreement with Russia and that with China, reflecting in large part the fact that they were negotiated in very different times and with countries with different economic structures and launch capabilities. In developing our positions for negotiation of the US-Russia agreement, we reviewed carefully both the terms of the China agreement and our experience under it. Where we thought we could refine the terms of the agreement with China, we have tried to incorporate appropriate changes in the agreement with Russia.

**MCDONNELL DOUGLAS**

*McDonnell Douglas Aerospace*

**ALAN B. KEHLET**  
*Vice President-Deputy General Manager*  
*Space Transportation*

**A3-L104-ABK-93014**  
**July 30, 1993**

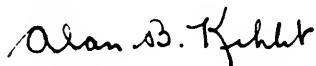
**JuliAnna Potter**  
**Subcommittee on Space**  
**2320 Rayburn HOB**  
**Washington, DC 20515**

**Subject:**     **Alan B. Kehlet's Testimony to the International Competition**  
                  **in Launch Services, dated 19 May 1993**

**Dear Ms. Potter,**

I have read the transcript of my testimony and find it complete and acceptable as written except for one word on page 55, line 1254. The word as written is "erroneous" should be "erosion".

**Sincerely,**

A handwritten signature in black ink that reads "Alan B. Kehlet". The signature is written in a cursive, flowing style.

**MCDONNELL DOUGLAS**

*McDonnell Douglas Aerospace*

ALAN B. KEHLET  
Vice President-Deputy General Manager  
Space Transportation

A3-L100-ABK-93013  
July 30, 1993

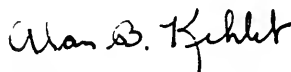
Ralph M. Hall, Chairman  
Subcommittee on Space  
U.S. House of Representatives  
Committee on Science, Space, and Technology  
Suite 2320 Rayburn House Office Building  
Washington, DC 20515-6301

Dear Mr. Chairman:

In reference to your letter dated June 14, 1993, I am pleased to be able to respond with the enclosed set of answers to your questions.

If we can be of further service to you, please do not hesitate to contact me at (714) 896-1885, or our Washington representative, Ms. Roselee Roberts, at phone (703) 412-1850.

Sincerely,



Enclosure

## **Written Questions for Mr. Kehlet**

**1. The newly agreed upon launch services trade agreement will allow up to two Russian launches per year, not to exceed 8 contracts between now and the year 2000. If this agreement is signed this year, what happens to your company next year?**

McDonnell Douglas expects no immediate impact on launches in 1994. No new launch contracts are known to be pending for a launch next year - since most customers plan 3 years or more ahead of the needed launch date.

However, the harmful effect will be seen when, following early successful sales and launches, customers begin to gain confidence in using Russian launch services as an alternative to western sources.

**a. How will your company deal with the effects from this agreement?**

Our company joins in the launch industry views and responses as a team solution. The most significant effect is likely to be acceptance by some customers of the Russians as a viable, capable provider of launch services. The issue remains - will the Russians comply with the terms of the agreement? The launch industry supports a position of a fair, strong trade agreement. In parallel, the US needs to focus on a long term U.S. solution to the need for a cost - effective world class launch system.

**b. How does your company plan to compete with Russian launch ventures?**

Unless the Russians comply with western standards for fair market rules, we cannot compete with the Russians, or any other non-market economy supplier.

Given the current trend on opening the limited market to the Russians, we have no choice but to join the industry in urging a fair space trade agreement before competitions are allowed. As long as the Russians continue to comply with the terms of the agreement - with both quantitative and price limits - we would consider Russian offers to be competitive and acceptable by standards of fair rules of the road. Therefore, our near term plan is to join with industry in urging implementation of a fair trade agreement.

For the long term, our plan includes finding and implementing a truly world class solution - whether an evolutionary approach from current systems or a totally new innovative solution - that will be more cost-effective than the competition, including the Russians. As described below, we strongly recommend a government-industry team effort in a balanced program of upgrading current ELVs and starting on next generation solutions.

**2. Please tell us what concerns you most about the launch services trade agreement Mr. Allgeler described to the Committee. Are you satisfied with the pricing provision?**

The area that concerns us the most is the absence of effective enforcement provisions. Although we have not yet seen the final written form of the agreement, compliance and enforcement are key to effective implementation of any agreement.

The lesson learned in the case of the US-PRC agreement is that, without an effective enforcement mechanism in the agreement itself, a non-market economy country would not be motivated to be compliant with such agreements.

This proposed new trade agreement on Russian space launches is no different. Control of the export of the US satellite for the customer's mission is the only effective mechanism that will assure compliance.

(In the questions list, there was no question a.)

**b. Other than "not less than 7-1/2 percent below the lowest western bid," what mechanism or what percent would your company propose the U.S. use as a pricing safeguard?**

We previously recommended 5 percent, but an enforceable 7-1/2 percent is acceptable.

There is an issue as to the definition of price, and what elements of price should be allowed. In the Inmarsat - Proton case, it was revealed that the price charged by the Russians was only one-half of the market price for that class of satellite, and the remainder of the cost was reportedly due to uncertain added costs such as transportation, security, and mission integration. The definition of cost increases due to added costs to the customer should be made clear.

The appropriate mechanism for a pricing safeguard could include an independent body of experts committed to safeguarding proprietary information and examining the final contracted price and lowest western bid to determine compliance. An effective remedy for non-compliance is rejection of the export license for the satellite in question.

**c. How would you prefer to see this mechanism enforced?**

As described above, the most effective mechanism for enforcement is the control of the export license for the US satellite of the mission at hand. If the Russians do not get paid because the Inmarsat customer could not assure the export of the Inmarsat satellite, the Russians will immediately comply. Penalizing another customer on a future mission will have far less effectiveness than to take quick action on the current mission.



The implementation of the enforcement process in the U.S. is critical. The process should begin based on a USTR determination that a compliance issue occurred - e.g. below the allowed price limit. Then USTR must be given the authority to direct the State Department to deny the export license on the satellite at issue. Then State Department must comply with the request from USTR.

**3. Should the U.S. government use its power over export licenses to regulate the Russian and Chinese launch business?**

This is our recommendation as described above.

**4. What about imports? Should the U.S. prevent the importing of Russian-built satellites to the U.S. for launch from Florida? Why, or why not?**

At the present time, the quality of Russian communications satellites does not equal that of US satellites. As a result, restrictions on imports of satellites would not have much impact on the marketability of Russian-built satellites for US launchers. So preventing the import of Russian satellites would not be meaningful.

On the other hand, Protons and similar rockets are well developed and have the proven quality demanded by customers, creating a highly competitive situation among world suppliers of launchers. Price is, therefore, an issue - resulting in the need for fair rules of the road on commercial space launch trade.

**5. What is your company doing to improve its launch services market share?**

In general, we continue to focus on those parameters that customers say they need and want from preferred launch suppliers - high mission success rate, launch on time, and lower cost. We continue to seek improvements to the current launchers and pursue new, innovative solutions that satisfies the needs of our customers.

**6. Earlier this year, the Subcommittee heard testimony in support of the "Spacelifter" launch vehicle program. It seems unlikely that Congress will be able to afford buying the "Spacelifter;" yet, some people say America cannot afford to be without it or some other new launch system. Do you believe a new launch vehicle will solve your company's competitive problems?**

We strongly urge a government led initiative to achieve a cost competitive and effective launch solution to meet both government and commercial needs by the turn of the century. We need a team of government and industry both investing in low cost launcher technologies and in developing a truly cost-effective launch vehicle system. Our international competitors have their governments funding

100% of new launcher developments. The industry can't do it alone - a team approach with the government taking the lead is the only practical answer.

**a. Would a new launch vehicle be competitive with the Russian Proton?**

A new launcher can be highly competitive with the Proton on the basis of performance, reliability, and launch operability. If the Russians adhere to fair rules of the road on prices, we can also be very price competitive.

**b. Would a new U.S. launch vehicle compete with the Proton under the pricing terms provided by this agreement?**

A new launcher could be very competitive on pricing terms. As long as the Russians are required to not price below 7-1/2 % below the lowest western bid, we can deliver a competitively reliable, schedule dependable product at an affordable price.

**c. Would the entry of a new U.S. launch vehicle system compete with existing U.S. launch vehicles exactly the same detrimental way that people say Russian vehicles will hurt U.S. market share?**

The entry of a new vehicle need not compete with existing vehicles - but it could be introduced to smoothly transition to the new solution with minimum disruption to current systems. If the current players in the US launch industry want to survive, they will participate in the development and production of a cost-effective family of new launchers. All of the incumbents have interest in progressing toward the next generation launch system.

**7. Should the U.S. define the term export differently so that a launch service could become eligible for export financing through the Export-Import Bank?**

The question assumes the current practice is that export financing is not eligible for commercial launch services. To the contrary, the current practice by the US Export-Import Bank is to guarantee bank financing or to directly finance US launch services for international buyers.

**8. Do you support the use of export financing to satellite companies for satellites that are sold to foreign parties but which are launched from U.S. facilities?**

If the question includes U.S. launchers launched from U.S. facilities, the answer is yes.

**9. Should the U.S. continue to uphold the policy that U.S. government payloads must fly on U.S. launch vehicles?**

There is no question that this is the only practical policy to assure a reasonable chance of survival against the highly subsidized international competition. It is imperative that the U.S. not relax on this policy.

**10. Isn't this policy a form of entitlement program for the U.S. launch vehicle business? If not, why not?**

This is the standard by all international launch system players in the world. We cannot force the Europeans to require U.S. access to European government missions. The same applies to Japan, PRC, and the Russians.

Also, all US government missions are competed among US suppliers - it is not a single source situation, which is another reason to retain a capability for the next generation solution by using competition to focus on retaining the best of the US providers in a competitive environment.

**11. US. government payloads have already flown on Russian launch vehicles. The Total Ozone Mapping Spectrometer, or TOMS instrument was launched by Russia almost two years ago on the Russian "Tsyclone" ("cyclone") rocket, using a Russian "Meteor" spacecraft bus. This export was approved in the interests of scientific cooperation. Should an exemption be granted to allow scientific research spacecraft to fly on foreign launch vehicles?**

We support the policy that all U.S. government missions fly only on U.S. launchers. The Europeans have a policy of flying government satellites only on Ariane. The Russians and Chinese don't make exceptions - they do not buy U.S. launch services for their government science missions.

At the same time, we recognize that limited cooperative science projects, such as a NASA or SDIO special experiment on a foreign launcher, have taken place. We believe that these should be done only on a fair basis and that US launchers continue to have the opportunity to place foreign science payloads into orbit.

**12. Please answer for the record if your company supports development of the so-called "Spacelifter" program.**

McDonnell Douglas supports the development of a space lift type of a cost-effective, world class launch system that meets the needs of government and commercial markets.

**13. Mr. Kehlet, your testimony seems to take a rather practical approach. You do not call for the government to buy you a new launch vehicle such as the "Spacelifter," but neither do you oppose Russian entry to the market, assuming it can happen under the terms of a trade agreement. What's your strategy?**

As stated above, we support a strategy of the government and industry working as a team, with both making investments toward the desirable, ultimate solution. We realize the practical matter of the need for the current Russian regime to survive and enter the market economy. We support their entry on the basis of no major disruptions to the limited market place.

**a. How do you plan to keep Delta flying and competitive?**

We continue to pursue product improvements that satisfy customer needs, exactly the same way that we have achieved the modern Delta II today. Over the last 3 decades, Delta has continuously been improved to better meet the demand for more performance at affordable prices. And we continue today to implement the same policy.

**b. If the Russians do harm French market share more than anyone else's market share, why shouldn't U.S. companies applaud the trade agreement?**

Under the agreement, it is not clear that the Russians will hurt the French market more than anyone else. It has been reported that the Europeans have reached an agreement with the Russians - including a pricing practice to be comparable to western prices. Their trade agreement appears to be similar to the U.S. agreement, so it is not clear that any other western supplier will be hurt any more or less than the U.S.

The principal issue is to assure a level playing field for all participants and not to allow unfair pricing and a disruptive capture of the market. Any agreement has the potential of setting a precedent. Letting the Russians capture more of the French market today would make them stronger in the world market and could result in a trend where it will be our turn to be harmed tomorrow.

**c. Do you support the agreement?**

With the exception that the enforcement mechanism needs to be more effective, we support the agreement if the written language corresponds to the description by the USTR.

**d. How many launches do you think McDonnell Douglas will lose to the Russians as a result of the agreement?**

At this time, we cannot make such an estimate. The market in the late 90's is yet to be defined, so the potential gain or loss is still uncertain.

## RESPONSES TO QUESTIONS FOR THE RECORD

1. The newly agreed upon launch services trade agreement will allow up to two Russian launches per year, not to exceed 8 contracts between now and the year 2000. If this agreement is signed this year, what happens to your company next year?

- a. How will your company deal with the effects from this agreement?
- b. How does your company plan to compete with Russian launch ventures?

*A. Signing of the agreement this year will enable LKEI to compete marginally in this commercial space market, constrained in sales and growth by the launch restriction.*

*a. If the quota persists, LKEI will perform within this constraint.*

*b. LKEI is not a competitor to Russian launch ventures. LKEI is an enabling mechanism to transition Russian know-how and technology to the U.S. to provide cheaper access to space that will compete against Ariane's market dominance.*

2. Please tell us what concerns you most about the launch services trade agreement Mr. Allgeier described to the Committee. Are you satisfied with the pricing provision?

a. Other than "not less than 7-1/2 percent below the lowest western bid," what mechanism or what percent would your company propose the U.S. use as a pricing safeguard?

b. How would you prefer to see this mechanism enforced?

*A. LKEI is fully prepared to compete on quality and responsiveness, rather than rely on artificial pricing and/or quota restrictions. Left alone, the market will determine the competitive prices of all options--the most effective and quickest way for the U.S. to undercut Ariane's market share.*

3. Should the U.S. government use its power over export licenses to regulate the Russian and Chinese launch business?

*A. No. A strong commitment to international commercial space commerce necessitates a global market economy free of restrictive and artificial barriers. The LKEI agreement provides a successful profit/democracy model for emulation to those not familiar with free enterprise..*

4. What about imports? Should the U.S. prevent the importing of Russian-built satellites to the U.S. for launch from Florida? Why or why not?

*A. No. A strong commitment to international commercial space commerce necessitates a global market economy free of restrictive and artificial barriers.*

**5. What is your company doing to improve its launch services market share?**

*A. Lockheed is investing in the Proton partnership (LKEI) and introducing the Lockheed Launch Vehicle, an extension of Lockheed's heritage in the design, development and servicing of advanced rocketry systems. Together, these initiatives will enable the U.S. commercial space launch industry to be more competitive with foreign space launchers currently dominating this market.*

**6. Earlier this year, the Subcommittee heard testimony in support of the "spacelifter" launch vehicle program. It seems unlikely that Congress will be able to afford buying the "spacelifter," yet some people say America cannot afford to be without it or some other new launch system. Do you believe a new launch vehicle will solve your company's competitive problems?**

- a. Would a new launch vehicle be competitive with the Russian Proton?
- b. Would a new U.S. launch vehicle compete with the Proton under the pricing terms provided by this agreement?
- c. Would the entry of a new U.S. launch vehicle system compete with existing U.S. launch vehicles exactly the same detrimental way that people say Russian vehicles will hurt U.S. market share?

*A. Development of the Spacelifter program for military systems is envisioned for first use in 2002. The issue today is the loss of American jobs and revenue from lower cost foreign commercial boosters like Ariane. Use of the Proton vehicle under LKEI auspices will improve America's competitive position in this market and will stimulate growth in the U.S. commercial satellite industry. A conservative estimate is that nine new satellites would be launched if the price of the launcher were reduced 30%, creating revenue growth in the \$10 billion satellite services and earth stations market. The niche Proton fills (4000-6000 lbs. to GEO), is not a direct competitor to existing or currently proposed U.S. commercial launchers.*

**7. Should the U.S. define the term export differently so that a launch service could become eligible for export financing through the Export-Import Bank?**

*A. LKEI does not plan to launch Protons from U.S. territory, hence this question does not affect LKEI. However, the Export-Import Bank should provide full services to all qualifiers seeking financial support.*

**8. Do you support the use of export financing to satellite companies for satellites that are sold to foreign parties but which are launched from U.S. facilities?**

*A. LKEI supports Export-Import Bank policies that are consistent with the National Space Policy.*

9. Should the U.S. continue to uphold the policy that U.S. government payloads must fly on U.S. launch vehicles?

*A. Serious consideration should be given to payloads of national security import. All others should enjoy an unconstrained market economy, for the consequences of not doing so will force nations like Russia to sell their missile technology to "unfriendly" countries.*

10. Isn't this policy a form of entitlement program for the U.S. launch vehicle business? If not why not?

*A. Yes, imposing restrictions on payloads of a national security nature is consistent with U.S. interests and those of other nation's practices. It is good economic sense to provide the most cost-effective options to get payloads to space.*

11. U.S. government payloads have already flown on Russian launch vehicles. The Total Ozone Mapping Spectrometer, or TOMS instrument, was launched by Russia almost two years ago on the Russian "Tsyclone" ("cyclone") rocket, using a Russian "Meteor" spacecraft bus. This export was approved in the interest of scientific cooperation. Should an exemption be granted to allow scientific research spacecraft to fly on foreign launch vehicles?

*A. Yes.*

12. Please answer for the record if your company supports development of the so-called "spacelifter" program.

*A. Current U.S. boosters are adaptations of 1950's missile technology. The old technology and costs of these systems constrain flexibility today. Development of an advanced aerospace booster should be seriously studied to determine if significant cost reduction will occur and what overall economic benefit will result.*

13. Why shouldn't we think Lockheed-Krunichev-Energia International's business as competing with U.S. interests?

a. How does your venture with Russia create U.S. jobs?

b. Since Mr. Wynne's written testimony said you'd cost the U.S. 8000 man years of employment, how many man years are you willing to say your venture will give the U.S.?

*A. LKEI enhances overall U.S. space revenue growth. As the price of launch is lowered, the total revenue for the launch segment market declines. However, at a sufficient cost reduction (approximately 30%), the demand for new launches makes up in total for the individual launch income reduction. Adding the number of new launches at their reduced cost (estimated to be nine satellites), would conservatively generate an additional \$1.6 billion in revenue. Thus LKEI enables U.S. aerospace growth, retains jobs and contributes to a more favorable balance of payments--all in consonance with U.S. interests.*

**GENERAL DYNAMICS**

***Space Systems Division***

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MICHAEL W. WYNNE  
Vice President  
General Dynamics Corporation  
President  
Space Systems Division

619 974-4900

13 July 1993

The Honorable Ralph Hall  
Chairman, Subcommittee on Space  
House Committee on Science, Space and Technology  
Rayburn House Office Building, Room 2320  
Washington, D.C. 20515

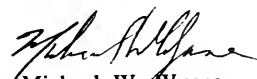
Dear Chairman Hall:

Enclosed please find responses to the questions for the record as submitted in your letter dated 14 June.

I appreciated the opportunity to testify before your Subcommittee on issues which we consider important to ensure the success of the U.S. space launch industry.

I look forward to discussing these and other issues with you in the future.

Sincerely,

  
Michael W. Wynne



**Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space**

1. *The newly agreed upon launch services trade agreement will allow up to two Russian launches per year, not to exceed 8 contracts between now and the year 2000. If this agreement is signed this year, what happens to your company next year?*
- a. *How will your company deal with the effects from this agreement?*
- b. *How does your company plan to compete with Russian launch ventures?*

1. Response:

Although we are pleased that the launch services trade agreement of allowing eight commercial Russian launches over the term of the agreement results in significantly fewer launches than the three per year that the Russians had requested, the market will certainly feel the impact of this trade agreement. Combined with the current PRC launch services trade agreement, approximately 25% of the current forecasted demand for commercial launch vehicles through the year 2000 will be authorized for non-market economies. This is a significant impact to an already thin market. The provision included in the agreement of allowing no more than two launch awards per year will help to mitigate the effects on the market. It is of fundamental importance that these provisions be adhered to by Russia, and enforced by the U.S.

1a. Response:

General Dynamics will continuously evaluate the market and forecasted demand to determine the viability of the industry. As the market begins to erode with the inclusion of NME participation, the company will make the necessary strategic decisions to optimize business opportunities.

1b. Response:

General Dynamics is working towards building the most reliable, cost efficient family of launch vehicles in the industry. This will offer the company the best opportunity to compete with Russian ventures. Continuous product improvement will be an integral element of minimizing cost. For this reason, congressional and administration funding support for a focused product improvement program on existing launch vehicles is extremely important.

**Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space**

2. *Please tell us what concerns you most about the launch services trade agreement Mr. Allgeier described to the Committee.*
- a. *Are you satisfied with the pricing provision?*
  - b. *Other than "not less than 7 1/2 percent below the lowest western bid," what mechanism or what percent would your company propose the U.S. use as a pricing safeguard?*
  - c. *How would you prefer to see this mechanism enforced?*

2. Response:

In addition to the potential loss of additional market share to another non-market economy, the primary concern is enforcement of the trade agreement. The agreement has a number of provisions designed to mitigate detrimental impact to the U.S. Industry. But unless these provisions can be strongly enforced, they are worthless. Experience with enforcing the current PRC agreement has not been encouraging. It is imperative that the U.S. take the necessary steps to put into place an established mechanism to strictly enforce both the Russia and PRC trade agreements.

2a. Response:

The pricing provision detailed in the trade agreement is reasonable and will hopefully set Russian bid prices at a parity with western launchers. However, the pricing provision will be a non-issue if it is not consistently and strongly enforced. Care must be taken to prevent Russia from simply bidding "7 1/2% below whatever the next lowest bid might be." Such action is definitely contrary to commercial market practices.

2b. Response:

7 1/2 percent below western launchers is reasonable.

2c. Response:

Legislation should be passed to require the U.S. Trade Representative or Department of Transportation to obtain launch services prices from all bidders when a satellite manufacturer applies for an export license. If the Russian bid is selected and falls within the 7 1/2 percent threshold, the export license should be issued without delay. If however, the Russian bid is greater than the 7 1/2 percent threshold, exception to the trade agreement for unusual circumstances must be justified within two weeks. In the event an exception is granted to the 7 1/2 percent threshold, for unusual and singular circumstance, all domestic launch service providers will be notified of the exception, including its rationale.

**Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space**

3. *Should the U.S. government use its power over export licenses to regulate the Russian and Chinese launch business.*

3. Response:

Whatever the U.S. government does, the Russians and the Chinese are free to launch their own satellites or those for other countries as they choose. The trade agreements are not for the purpose of regulating their launch businesses, but for regulating the number and conditions for their launches of U.S. satellites. Export licenses should be issued to U.S. satellite manufactures only after careful review of all launch vehicle bids to ensure Russian and Chinese compliance with current trade agreements.

Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space

4. *What about imports? Should the U.S. prevent the importing of Russian-built satellites to the U.S. for launch from Florida? Why or why not?*

4. Response:

Maintaining the viability of this country's domestic satellite industry is just as important as maintaining the viability of our domestic commercial launch vehicle industry. In addition to being a non-market economy, Russia generates no demand for U.S. launch vehicles or satellites. Therefore, a comparable trade agreement should be developed to control the imports of Russian satellites.

**Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space**

5. *What is your company doing to improve its launch services market share?*

5. Response:

Capability, reliability, cost effectiveness are the most critical discriminators in improving market share. General Dynamics has invested almost a billion dollars to develop a family of vehicles with a broad range of launch capabilities. This weight range capability has allowed us to capture a marginal share of the market as it exists today. However, since non-market economies have been authorized to increase their participation in the commercial launch market, and all other foreign launch providers have government funded product improvement programs, U.S. private industry can no longer take the risk of investing large sums of money into new and/or improved vehicle programs given the uncertainty of future government policies. Government funding is badly needed for product improvements which will not only broaden the capability of current LVS. but will lower costs as well. Joint ventures, such as combining General Dynamics Upper Stage Centaur with other launch service providers' first stages on vehicles may also be a possible means of broadening market share.

**Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space**

6. *Earlier this year, the subcommittee heard testimony in support of the "Spacelifter" launch vehicle program. It seems unlikely that Congress will be able to afford buying the "Spacelifter" yet, some people say America cannot afford to be without it or some other new launch system. Do you believe a new launch vehicle will solve your company's competitive problems?*
- a. *Would a new launch vehicle be competitive with the Russian Proton?*
  - b. *Would a new U.S. launch vehicle compete with the Proton under the pricing terms provided by this agreement?*
  - c. *Would the entry of a new U.S. launch vehicle system compete with existing U.S. launch vehicles exactly the same detrimental way the people say Russian vehicle will hurt U.S. market share?*

**6. Response:**

The U.S. needs to develop a new launch vehicle to compete with new vehicles which are being developed, and funded by governments all over the world.

**6a. Response:**

Evaluating the capability of a new launch vehicle such as Spacelifter to compete with Proton is impractical due to the difficulty in evaluating the cost of a launch system developed under non-market economy conditions. Spacelifter will be designed from the ground up as a low cost launch system, and could be competitive with a Proton assuming comparable market conditions.

In terms of reliability and responsiveness, Spacelifter will be very competitive with Proton because Spacelifter embraces many of the attributes of Proton, including subsystems and components designed for robustness rather than optimized for performance, redundancy in flight critical components and simplified manufacturing techniques. Unlike Proton, however, Spacelifter will infuse state-of-the-art technology such as Integrated Health Monitoring to significantly improve reliability.

6a. Response Continued:

Spacelifter will be designed in coordination with payload manufacturers to ensure simplified interface and integration requirements. This is a key discriminator when comparing total cost of launch and not just cost of the vehicle.

6b. Response:

Because Spacelifter is not expected to be operational until sometime between 2005 and 2010, it is difficult to anticipate the competitive environment at that time.

6c. Response:

A new launch vehicle such as Spacelifter is intended to eventually replace existing systems once it is a proven operational system. The scope of the program as envisioned requires a team of contractors that will become the core of the U.S. launch industrial base. This will ensure a robust U.S. launch vehicle manufacturing capability.



**Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space**

7. *Should the U.S. define the term "export" differently so that a launch service could become eligible for export financing through the Export-Import Bank?*

**7. Response:**

Some U.S. satellite companies request government-backed export financing as a part of the bid. The present situation is that Arianespace is able to offer guarantees backed by the French export credit agency, and the U.S. companies cannot. The Export-Import Bank of the U.S. is restricted from providing any financial support under current regulations. This places U.S. launch providers at a distinct competitive disadvantage in these circumstances.

The problem can be corrected by (1) redefining export so as to include launching foreign satellites from U.S. territory, which may allow Export-Import financing under current regulations; or (2) establishing an agreement as was done by the commercial aircraft industry in competitions between Airbus Industries and two U.S. aircraft manufacturers. To achieve a level playing field, an agreement was reached whereby export credit agency financing is not available for commercial aircraft exports to either side.

Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space

8. *Do you support the use of export financing to satellite companies for satellites that are sold to foreign parties but which are launched from U.S. facilities.*

8. Response:

Yes. Supporting export financing for satellites sold to foreign parties maintains demand for U.S. commercial launch services if launched from U.S. facilities.

Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space

9. *Should the U.S. continue to uphold the policy that U.S. government payloads must fly on U.S. launch vehicles?*

9. Response:

Absolutely. Every other country in the world with launch capability restricts their government payloads to their launch vehicles whose development they have previously funded. The Arianespace Board of Trustees has requested recently that the European countries be required to use Ariane for all European satellites - - both government and commercial.

General Dynamics has developed the Atlas family primarily through expending hundreds of millions of dollars of corporate funds. Foreign governments should not be allowed to compete for government payloads to the detriment of our government-encouraged, privately-funded commercial launch industry.

Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space

10. *Isn't this policy a form of entitlement program for the U.S. launch vehicle business? If not, why not?*

10. Response:

Yes, this might be considered a form of entitlement program, but the precedent has been set with a number of industries. For example, the U.S. has maintained a "flag carrier" policy for many of its industries, including the airline industry which has benefited from this policy for many years. This policy may only need to last until LV improvements and next-generation vehicle make U.S. competitive!!

**Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space**

11. *U.S. government payloads have already flown on Russian launch vehicles. The Total Ozone Mapping Spectrometer, or TOMS instrument was launched by Russia almost two years ago on the Russian "Tsyclone" rocket, using Russian "Meteor" spacecraft bus. This export was approved in the interests of scientific cooperation. Should an exemption be granted to allow scientific research spacecraft to fly on foreign launch vehicles?*

**11. Response:**

No. Such exceptions should be done only when they are joint scientific ventures and should be judged on a case-by-case basis.

**Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space**

12. *Please answer for the record if your company supports development of the so-called "Spacelifter" program.*

12. Response:

General Dynamics Space Systems Division strongly supports government development of a next generation national launch system and believes it is a key element in preserving the nation's space transportation capability. The selection and development of a single, modular launch vehicle that can meet all realistic requirements for DoD, civil and commercial users is imperative, and will reduce cost by at least a factor of two.

Other nations are developing new or greatly improved launch vehicles with complete national funding. To have a chance of remaining competitive in the international market and bridge the gap to the next generation of launch system, it is necessary that our existing fleet be enhanced with new technology from the NASA and Air Force research and development program through at least the remainder of this decade. To this end, a number of critical component technologies which should have priority for reducing costs and improving reliability have been identified. If these are pursued with a high priority, current U.S. launch vehicles will be more competitive in the international commercial market. The Government's investment will be recovered through reduced costs on future purchases of launch services. This program allows for the refinement of these technologies through application to current vehicles while at the same time validating the technology base for a new "clean sheet" national launch system. The infusion of technologies applicable to both the existing fleet and the next-generation launch vehicle will result in early pay-back of investment as well as reduced technical risk.

**Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space**

13. *In your testimony, you cite the study commissioned by General Dynamics and performed by Dr. David Louscher. According to him an estimated 8,618 man years would be lost if just three launches per year went to China and/or to Russia. Tell us, would that same kind of estimate hold true with respect to the French Ariane rocket? If not, why not?*
- a. *The French are your primary competitors, are they not? Haven't they also cost the country at least three launches in some recent years, as well as 8,618 man years?*
- b. *What is the basis of the 8,618 man year estimate?*
- c. *About how many people are we talking about? How many people correspond to one man year?*

**13. Response:**

Dr. David Louscher is a well known and respected economist who performed an independent study for General Dynamics. In this study, he uses a commonly accepted, conservative standard of 22,800 man years of employment generated for every \$1 billion of business. This standard is derived from a Department of Commerce report. The employment impact has implications for the communities in which the aerospace firms are located. Indirect employment is created by a multiplier effect associated with the direct employment generated from any given procurement. The national average is that every man year of direct employment in aerospace creates an additional 0.75 man year of employment in the surrounding community.

By using the average price of an Atlas launch vehicle, Dr. Louscher derives the effect of losing 3 launches per year to Russia, or China, or any other foreign country.

**13a. Response:**

Yes.

**13b. Response:**

See response to 13.

13c. Response:

A man year more accurately measures employment opportunity or loss of employment opportunity than does "job". A man year is a calculation of hours of employment which may vary from 1750 to 2000 hours per year depending on the product being manufactured.

The impact on the U.S. economy of Atlas commercial launch services is quite extensive. Over 1200 contracts in 43 states and 224 congressional districts contribute to the program.



Written Responses to Ralph M. Hall, Chairman  
Subcommittee on Space

14. *How do you overcome the fact that the Russian Proton is a highly reliable launch system? Isn't it more reliable than the General Dynamics Atlas rocket?*

14. Response:

Based on Russian data, the Proton is a mature launch system whose reliability is generally equivalent to other mature systems which include, Delta, Atlas, Titan, and Ariane.

Orbital  
Sciences  
Corporation



July 7, 1993

The Honorable Ralph M. Hall  
Chairman  
Subcommittee on Space  
Committee on Science, Space and Technology  
U.S. House of Representatives  
Washington, D.C. 20515

Dear Chairman Hall:

I am pleased to respond to your additional questions for the record relating to the May 19 hearing on *International Competition in Launch Services*. I also want to thank you again for inviting me to testify on this vitally important space issue.

I look forward to working with the Subcommittee in the future.

Sincerely,

A handwritten signature in dark ink, appearing to read "David W. Thompson".

David W. Thompson  
President and CEO

## Answers to Questions for David W. Thompson, President and CEO, Orbital Sciences Corporation

1. (a. and b.) The quantitative provisions of the launch services trade agreement address primarily those launches into geosynchronous Earth orbit (GEO) or geosynchronous transfer orbit (GTO). As a company that designs, develops and manufactures small launch vehicles that traditionally deploy payloads into low Earth orbit (LEO), OSC believes some additional definition and clarification are necessary before we truly have an agreement that protects the competitiveness of U.S. companies in all segments of the space launch market. Although the agreement specifies that future LEO launches will be addressed in the context of "annual consultations" or "case-by-case analysis," we believe the LEO market is so fundamentally unique in terms of the U.S. market position that additional deliberation and caution must be exercised in this area. Our negotiators must be particularly careful in the "small" space launch market, where U.S. companies currently command nearly 100% of the worldwide market share, i.e., for every three LEO launches on Russian vehicles, the U.S. loses three launch opportunities. By contrast, in the "large" market where the U.S. only supplies about 35% of the market, three Russian launches result in the loss of one U.S. launch and two European or Chinese launches. Therefore, any future agreements with the Russians on LEO launches should carry an impact on U.S. companies no worse than the impact associated with the agreement on GEO and GTO launches.

2. (a. and b.) The pricing provisions of the launch services trade agreement also address those launches into geosynchronous Earth orbit (GEO) or geosynchronous transfer orbit (GTO). Again, OSC's concern centers on the provisions addressing LEO launches. Therefore, any future agreements with the Russians on LEO launches should carry an impact on U.S. companies no worse than the impact associated with the agreement on GEO and GTO launches. It is **impact on U.S. industry**, as opposed to a specific pricing threshold, that must determine whether a particular LEO launch should go forward on a Russian launch vehicle. In terms of enforcement, periodic reviews involving the trade and policy representatives of both countries (with appropriate consultation with industry) should be held to examine current and proposed launch arrangements and their pricing structures.

3. Regulation of export licenses is certainly one way to address the entry of Russia and China into the launch marketplace. If the U.S. is to retain and improve its share of the international commercial launch market, we need to employ all means at our disposal to guarantee a level playing field. Such a policy requires a blend of carefully constructed international agreements, regulatory policies and enforcement.

4. The U.S. should not prevent the import of Russian-built satellites to the U.S. for launch, as long as the launch vehicle of choice is of U.S. origin. In fact, U.S.

Government policies should encourage U.S. launches of foreign payloads, provided the net effect is not encouraging direct competition between foreign and U.S. satellite builders. The current large satellite market is characterized by significant U.S. dominance. Care must be exercised, however, as changes occur in the world market.

5. During the past five years, American launch companies have achieved dramatic reductions in the cost of Earth-to-orbit transport for small payloads. These companies have invested their own capital to develop a new generation of technologically advanced small rockets three times cheaper, on a cost-per-payload-pound basis, than mid-1980's-vintage launchers. They have captured practically all the 100-plus small rocket contracts awarded worldwide over the past three years, often in competition with government-backed non-U.S. suppliers. Today, OSC and other companies are continuing to pursue a diversity of innovative approaches (including aircraft-launched rockets, solid/liquid hybrid engines, airbreathing propulsion and modular construction vehicles) that are expected to decrease launch costs by an additional 50% within several years, and thereby contribute significantly to enhancing market share.

6. a., b., c. The funding and development of the "Spacelifter" or some other new launch system would not directly impact the ability of OSC to compete in the launch services arena. A new U.S. launch vehicle system has been directed at the larger end of the space launch market. In the "small" space launch market, where OSC conducts the majority of its business, U.S. companies currently command nearly 100% of the worldwide market share. Therefore, the entry of Russian launch vehicles is much more detrimental to market share.

7. The U.S. Government should amend the current definition of "export" to include launch services. If the U.S. goal in offering inexpensive export financing is to foster U.S. competitiveness overseas, launch services represent an important national "competitive edge." We anticipate international demand stimulated by the flexibility and low cost of our Pegasus launch vehicle, for example, to increase over the next few years. One of the attributes that makes the system unique and a major attraction for prospective foreign customers is the opportunity to purchase a totally deployable package: Pegasus, payload integration and testing, launch control, and air launch by our own aircraft. Whether we offer these launch services to a foreign customer here or in the host country should not determine

8. Export financing for U.S. payloads sold to a foreign customer but launched from U.S. facilities should be supported, provided the launch vehicle is of U.S. origin.

9. U.S. Government payloads should continue to fly only on U.S. launch vehicles. By remaining a reliable customer for a U.S. industry with significant

domestic and international economic potential, the government will continue to reduce costs and enhance competitiveness. (See answer to Question 10)

10. Restricting launches of U.S. Government payloads to U.S. launch vehicles is not in any way an entitlement. On the contrary, the U.S. Government has acted as "anchor customer" by playing a critical role in encouraging development of a commercial launch industry and in providing incentives for companies like OSC to enter the small launch vehicle market. The "technology partnerships" built between government and industry can continue to realize cost reductions and innovation if they are sustained. The immediate return on investment of public funds will continue to accrue from cost savings on government launches, supplemented by the even larger benefits of domestic market expansion and international market dominance for U.S. suppliers.

11. Exemptions for scientific research spacecraft to be flown on foreign launch vehicles are potentially injurious to U.S. launch companies. These spacecraft are usually smaller in size, enabling support from smaller launch vehicles. For every one of these spacecraft we offer up for foreign launch, the U.S. launch industry loses one corresponding opportunity.

12. OSC does support development of the "Spacelifter" program.

13. Russian competition in OSC's specific line of space products is already observable. Brazil's choice of our Pegasus as the launch vehicle for its first satellite was a case in point. The Russians competed directly with OSC for Brazil's SCD-1 launch. Russian capabilities do not reside with the Proton alone; they have a fairly robust family of launch vehicles (and missiles convertible to launch vehicles) to compete on an international scale. Also in the near term, Russia can also offer companies opportunities to launch smaller payloads as secondaries or tertiaries on their larger Proton rockets.

14. a. The Russians definitely have a number of viable products in their excess missile asset inventory which could be applied to commercial launches. There are numerous ICBM's and SLBM's that can be converted for commercial launch purposes. If these assets were used in this way, not only would this huge, subsidized inventory of 1,400 missiles compete directly with U.S. launch vehicles in a limited market, but monumental global missile proliferation risks would be unleashed as well.

b. The Russians should not be permitted to use their missile assets for commercial orbital launch purposes. Likewise, it would neither be fair nor prudent for the U.S. to release its missile assets for these purposes. Sustaining the rapid progress U.S. launch companies have made in reducing costs and spurring innovation will continue only if the U.S. Government refrains from "dumping" excess missile assets on the small-satellite launch market. Such distortion of the free market, placing our Government in competition with the

private sector, would violate a decade-old national policy that encourages commercial investment in space systems. Furthermore, there is no reason to believe that converted military missiles would make low-cost space launchers. Significant modification and refurbishment are required for the 20- to 30-year-old missiles, involving much higher costs than currently predicted. Finally, if a U.S. goal is to stem the tide of missile proliferation around the globe, we need to set the example by restricting our own use of excess missiles to suborbital purposes only.

c. The best approach for the U.S. to prevent excess missile assets from being "dumped" on the commercial space launch market is to restrict our own use of these assets and insist on similar discipline from Russia. Recently, the Deputy Secretary of Defense approved a policy concerning the release of excess strategic ballistic missile assets. Basically, the policy states that these assets will be retained for government use or be destroyed. They may be used as appropriate without prior approval for any purpose except to launch payloads into orbit. Requests from within DoD to use these assets for launching payloads into orbit will be considered on a case-by-case basis, where a primary factor in that consideration would be whether the use would meet DoD needs in a cost-effective manner compared to a commercial procurement. For this new DoD policy to be effective, the U.S. Government must establish a set of groundrules or criteria that would govern consideration of using excess strategic missile assets for orbital applications under the case-by-case provisions. If it is determined that excess missiles must be released to meet a unique U.S. Government requirement, certain criteria for ensuring a level playing field should be adopted, such as: 1) If the Government has a mission requirement, it should release a Request for Proposal to competitively procure a complete launch service (including hardware, support services, range operations, etc.) and make available excess missiles as government-furnished equipment to any qualified bidders who wish to propose them; 2) excess missiles should be provided to prospective bidders at a fair market price; 3) the bidders who propose use of the missiles should be required to pay all recurring costs, incurred by the Government, associated with transporting, refurbishing, inspecting and storing the missiles; and 4) the bidders who propose to use the missiles should be required to pay all non-recurring costs.

## Written Questions for Mr. Teets

**Question 1.** The newly agreed upon launch services trade agreement will allow up to two Russian launches per year, not to exceed 8 contracts between now and the year 2000. If this agreement is signed this year, what happens to your company next year?

- a. How will your company deal with the effects from this agreement?
- b. How does your company plan to compete with Russian launch ventures?

**Answer 1.** The launch services trade agreement pertains only to commercial launches. We believe that restrictions on the use of foreign launch vehicles put U.S. commercial satellite builders at a distinct disadvantage in competing with foreign commercial satellite builders. Therefore, we would much prefer that the U.S. government not impose pricing or volume constraints on foreign launch vehicles. This kind of market intervention runs the risk of driving commercial satellite buyers away from U.S.-built satellites.

As regards the specific launch services trade agreement negotiated with Russia, it is difficult to predict or quantify with any precision its likely impact on our business next year, but we will follow the situation closely.

- a. We will urge Congress and the Administration to preserve a level playing field in the international commercial satellite market by supporting a market approach to commercial launch services.
- b. We will continue to invest in the modernization and improvement of our Titan family of launch vehicles and support the infrastructure improvements necessary to sustain an internationally competitive space launch capability.

## Written Questions for Mr. Teets

Question 2. Please tell us what concerns you most about the launch services trade agreement Mr. Allgeier described to the Committee. Are you satisfied with the pricing provision?

- b. Other than "not less than 7-1/2 percent below the lowest western bid," *what mechanism or what percent* would your company propose the U.S. use as a pricing safeguard?
- c. How would you prefer to see this mechanism enforced?

Answer 2. We believe that pricing restrictions distort the market and are ultimately harmful to American commercial satellite builders. What is most disturbing is that such price restrictions can provoke various forms of retaliation detrimental to our long-term interests. Restrictions on the number or price of foreign launches will have the ultimate effect of forfeiting the market to foreign satellite builders and putting thousands of skilled Americans out of work. Therefore, we support the free access of U.S.-origin commercial satellites to foreign launch vehicles.

- b. As noted above, we do not support the concept of these pricing safeguards as trade policy.
- c. Our preferred approach would be to enhance the competitiveness of U.S. launch vehicles through investments in technology and infrastructure, rather than the enforcement of such mechanisms as this trade agreement.



**Written Questions for Mr. Teets**

**Question 3.** Should the U.S. government use its power over export licenses to regulate the Russian and Chinese launch business?

**Answer 3.** We strongly object to the use of export licensing as a means of influencing the selection of launch vehicles by satellite buyers. Such restrictions are ultimately self-defeating, in that they are easily circumvented by the purchase of non-U.S. satellites which are free to be flown on any launch vehicle the buyer chooses.

**Written Questions for Mr. Teets**

**Question 4.** What about imports? Should the U.S. prevent the importing of Russian-built satellites to the U.S. for launch from Florida? Why, or why not?

**Answer 4.** As a general rule, the U.S. should not prevent the launch of Russian-built satellites on a commercial basis from a U.S. launch site (e.g., Florida). This policy should, however, be reviewed on a case-by-case basis.

**Written Questions for Mr. Teets**

**Question 5.** What is your company doing to improve its launch services market share?

**Answer 5.** We are investing in technologies and in process improvements which will enhance launch vehicle performance, reliability, and flexibility. These include the vehicle itself, the ground equipment, and the launch infrastructure. We are also exploring alternative vehicle configurations, such as "spacelifter," which can compete across a broad range of requirements.

## Written Questions for Mr. Teets

Question 6. Earlier this year, the Subcommittee heard testimony in support of the "spacelifter" launch vehicle program. It seems likely that Congress will be able to afford to be without it or some other new launch system. Do you believe a new launch vehicle will solve your company's competitive problems?

- a. Would a new launch vehicle be competitive with the Russian Proton?
- b. Would a new U.S. launch vehicle compete with the Proton under the pricing terms provided by this agreement?
- c. Would the entry of a new U.S. launch vehicle system compete with existing U.S. launch vehicles exactly the same detrimental way that people say Russian vehicles will hurt U.S. market share?

Answer 6. While a new launch vehicle could provide the basis for a more competitive position in the market, we should not lose sight of the fact that we can make important improvements to our Titan in the near term which will enhance its ability to compete in world markets. Therefore, we do not see the situation in all-or-nothing terms, but rather as an incremental process whose each step, from infrastructure, to improved Titan, to new launch vehicle, makes America better able to compete internationally.

- a. Yes, especially as Russia moves toward market pricing.
- b. It would likely be so, although as previously stated, we do not favor pricing restrictions.
- c. There is the distinct possibility that a next-generation launch vehicle would involve those who build the existing U.S. launch vehicles, rather than be in competition with launch vehicle builders, individually or otherwise.

**Written Questions for Mr. Teets**

**Question 7.** Should the U.S. define the term export differently so that a launch service could become eligible for export financing through the Export-Import Bank?

**Answer 7.** While we would have to study the implications of such a proposal, the idea certainly appears to have merit.

**Written Questions for Mr. Teets**

**Question 8.** Do you support the use of export financing to satellite companies for satellites that are sold to foreign parties but which are launched from U.S. facilities?

**Answer 8.** Yes, but we would not limit such financing to launches from U.S. facilities, but broaden its coverage to include any U.S.-origin commercial satellite without regard to launch site.

## Written Questions for Mr. Teets

Question 9. Should the U.S. continue to uphold the policy that U.S. government payloads must fly on U.S. launch vehicles?

Answer 9. Yes, the U.S. government should continue to uphold the long-standing policy which requires U.S. government spacecraft employed for civil or defense missions to be launched only on U.S. boosters. This so-called "flag-carrier" policy is critical to the viability of our domestic launch industry and provides the necessary business base to assure this nation continues unrestricted access to space for critical national security missions.

With this predictable business base, U.S. launch vehicle builders will continue to invest company funds to achieve the improvements which will lower the cost and increase the responsiveness of the U.S. launch vehicle fleet.

**Written Questions for Mr. Teets**

**Question 10.** Isn't this policy a form of entitlement program for the U.S. launch vehicle business? If not, why not?

**Answer 10.** If we are to maintain a domestic industrial base to support key national requirements, then this kind of policy will occasionally be necessary. Space is something of a special case, given both the compelling nature of the requirement and the unique characteristics of the supplier base. So long as we do not wish to have such a crucial element of our national interest held hostage to world events, this is not an entitlement, but a prudent public policy.



**Written Questions for Mr. Teets**

**Question 11.** U.S. government payloads have already flown on Russian launch vehicles. The Total Ozone Mapping Spectrometer, or TOMS instrument was launched by Russia almost two years ago on the Russian "Tsyclone" ["cyclone"] rocket, using a Russian "Meteor" spacecraft bus. This export was approved in the interests of scientific cooperation. Should an exemption be granted to allow scientific research spacecraft to fly on foreign launch vehicles?

**Answer 11.** We support the idea of flying U.S.-origin scientific instruments aboard foreign launch vehicles when they are integrated on a foreign spacecraft as part of a larger, cooperative mission. Complete spacecraft, when they are U.S. government programs, ought to be launched on U.S.-built launch vehicles, per the previously-mentioned "flag-carrier" policy.

**Written Questions for Mr. Teets**

**Question 12.** Please answer for the record if your company supports development of the so-called "spacelifter" program.

**Answer 12.** We fully support the "spacelifter" program, as well as the investments in infrastructure which will enhance this as well as current capability.

## Written Questions for Mr. Teets

Question 13. Mr. Teets, your company recently acquired the GE Astrospace company. That action typifies much of the behavior in the post-Cold War aerospace industry: consolidations, divestments, and joint ventures. In your opinion, Mr. Teets, is there anything wrong with what Lockheed is doing with their venture in Russia?

- a. From an economics standpoint, how is a joint venture company formed with a Russian factory different from Martin Marietta's acquisition of GE-Astro?
- b. Since Martin Marietta is now much more heavily in the payload business, how are you reconciling the internal company philosophies between payload sales and the viability of your launch services division?

Answer 13. While we have no objection in principle to the Lockheed joint venture, the details are not yet clear. Therefore, we will reserve judgment on this issue.

- a. First, as a domestic transaction, the Martin Marietta-G.E. Aerospace merger preserves and consolidates the position of two U.S. businesses, whereas the international nature of the Lockheed-Krunichev-Energia joint venture is essentially the grating of marketing rights to foreign-built products.

Beyond that there are, of course, enormous tax, employment, and technology-transfer issues which make the two transactions very different in nature.

- b. We believe that a two-track approach, that is, U.S. government payloads on U.S. launch vehicles, and a market approach to the launch of U.S. commercial satellites, not only serves the national interest, but serves our interest as well.

**Written Questions for Mr. Teets**

**Question 14.** If it would prove more favorable to your customer, would Martin Marietta be willing to fly one or more of its commercial satellites on a Russian or Chinese launch vehicle? Why or why not?

**Answer 14.** A Martin Marietta-built Inmarsat spacecraft has been approved by the State Department to fly on a Proton launch vehicle. Similarly, we will launch a Martin Marietta-built Asiasat on a Long March. Such launches typify the markets which we serve and sustain the employment of thousands of highly-skilled and high-motivated Americans.

**Additional Questions for Mr. Zeger**

1. *What is the key feature of a launch for your company and your customers?*
  - a. *Is it price? Reliability? What do you consider most important when considering the launch service required to put one of your satellites in use?*

Both Inmarsat and INTELSAT procurement policies are designed to encourage world-wide competition in the supply of goods and services. To this end, the fundamental criteria upon which contracts are awarded is the best combination of quality, price and most favorable delivery schedule.

- b. *Of the many attributes you and your customers require, is there anything that says "Buy American"?*

There is no "Buy American" provision in either the Inmarsat or INTELSAT procurement regulations, and since it is an international partnership it would be inappropriate if such a provision existed. Nevertheless, U.S. companies are proven world leaders in the provision of spacecraft and launch vehicle services and the majority of contracts that INTELSAT and Inmarsat have awarded have been won by U.S. corporations. COMSAT has and will continue to strongly represent the interests of U.S. corporations assuming they continue to provide competitive bids which meet the procurement criteria.

2. *Are the Russians in the commercial satellite business today?*

Russian firms have begun marketing some spacecraft on the world market, and they have had some success in selling their *Express* class satellite primarily to start-up firms. However, the Russians have sold options to INTELSAT which would allow for the purchase of up to three *Express* class satellites. Additionally, Russian firms are leasing space segment capacity on Russian owned and operated satellites directly to European, Canadian and U.S. firms.

- a. *Why wouldn't the Russians start dumping satellites on the world market?*

The commercial markets in which Russian satellite manufacturers can compete would appear to be limited due to the level of Russian technology. U.S. and European manufacturers should be able to compete with the Russians in those markets which require higher-end technology. In those markets where Soviet technology is adequate, U.S. manufacturers would be able to compete using earlier satellite bus designs if they elect to do so.

- b. *If the U.S. gives the Russians Western currency from space launches under the agreement, and then Russia uses the cash to improve its satellite products, wouldn't you say that's a mistake?*

It is our understanding that the commercial space launch agreement to be signed by the U.S. and Russia contains provisions to assure the U.S. Government that any bids for launch service contracts are cost justified. What the Russians do with the proceeds is not addressed by the proposed agreement. Moreover, a number of U.S. and foreign-based manufacturers supply both launch vehicles and spacecraft and we do not view this to be a problem.

- c. *With or without U.S. currency, Russia is able to sell satellites. How is the satellite business for Russia these days?*

Our understanding is that the commercial market for Russian designed and built communications satellites is limited. However, the Russians have begun to sell a limited number of spacecraft on the international market.

3. *How does their entry into the launch segment help their ability to compete in the spacecraft business?*

We do not believe that Russia's entry into the commercial launch vehicle market will in any way directly enhance their ability to compete in the commercial spacecraft market. Nevertheless, the Russian space industry as a whole will benefit from the commercial experiences of Russian launch service providers and in a general sense this will make Russian industry more attentive to Western commercial concerns.

4. *Last year it was through the efforts of the Inmarsat consortia that the Russians earned their first Western launch, which is in many ways the reason we are here today. The one-time exception under which Inmarsat will be allowed to fly one satellite on the Russian Proton was conditioned on negotiating the trade agreement Mr. Allgeier presented here.*

*Tell us how COMSAT views the use of one-time exceptions?*

We believe the one-time exception proved to be an extremely important inducement which brought Russia to the negotiating table to seriously discuss the terms and conditions of the launch services trade agreement. We believe it was a strong sign of good faith on the part of the U.S. Government and an opportunity to ascertain Russian attitudes toward Western commercial trade policies.

5. *Didn't your company believe at that time that by letting the Russians fly one of the four Inmarsat series, a U.S. company would earn the remaining launches?*

At the March 1992 session of the Inmarsat Council, Inmarsat awarded two of the four launch contracts for the Inmarsat-3 spacecraft to General Dynamics (the Inmarsat-3 F1 & F2 spacecraft). The remaining two launches were considered at the July and November 1992 sessions, with the awards going to Arianespace (F3) and DB Salyut (F4), respectively. The decision to launch the Inmarsat F4 on a Proton was made purely on the merits of the bid received and was completely unrelated to the award for launch of the F3 spacecraft.

6. *What does the Inmarsat Council's action tell you and tell us about the competitive process?*

As indicated above, Inmarsat manages a professional and competitive procurement process which is based on sound commercial principles, and which encourages world-wide competition in the supply of goods and services.

7. *How would you describe your role as a signatory to the international consortia, INTELSAT and Inmarsat, relative to buying launch services?*

As the largest single Signatory investor in INTELSAT and Inmarsat, COMSAT possesses a voting share of 21%-23% respectively on any major procurement matters which come before the INTELSAT Board of Governors and the Inmarsat Council. However, such major decisions must be made with either the implicit or explicit support of the Signatories or groups of Signatories representing two-thirds voting share on the Board of Governors or Council. As a result, while COMSAT may strongly advocate its views on certain contract awards, final decisions are not made without the concurrence of other major Signatories.

COMSAT's positions on which bidders should receive launch vehicle service awards is driven by the commercial criteria of the best combination of quality, price and the most favorable delivery schedule. As U.S. Signatory, COMSAT seeks to ensure that U.S. industry receives fair and impartial consideration for all procurements which come before the INTELSAT Board of Governors and the Inmarsat Council.



**RESPONSE TO QUESTIONS FROM THE COMMITTEE ON SPACE****HOUSE OF REPRESENTATIVES**

Q1. What is the key feature of a launch for your company and your customers?

a. Is it price? Reliability? What do you consider most important when considering the launch service required to put one of your satellites in use?

**ANSWER:** There is a price/reliability trade-off, with reliability generally given greater consideration. If there is no proven track record for the launch vehicle, or if there have been recent failures, launch insurance will be higher than if the vehicle had proven reliability. Customer requirements must also be given proper consideration. If there is a pressing need to get the satellite in service at the earliest possible moment, or if a failure could be catastrophic to the company, reliability would be given even greater consideration.

b. Of the many attributes you and your customers require, is there anything that says "BUY AMERICAN"?

**ANSWER:** There is a strong "buy American" culture in Loral Corporation, and a deep-seated belief that the United States must have a healthy, competitive launch capability. However, both Arianespace and Russia have better prices and greater reliability for spacecraft in the weight class in which Space Systems/Loral specializes. Additionally, our largest commercial customers have been INTELSAT and Japanese corporations. Possible advantages may accrue to those customers from purchase of launch services from a country other than that in which the spacecraft is manufactured.

Q2. Are the Russians in the commercial satellite business today?

a. Why wouldn't the Russians start dumping satellites on the world market?

**ANSWER:** The Russians are active in the commercial satellite business today. There are reports that Rimsat, a U.S.-based company, has purchased EXPRESS satellites from Russia for Pacific Rim coverage. Additionally, options to purchase similar spacecraft have been negotiated by INTELSAT. It is anticipated that even greater price competition will come from Russian satellites, however it is yet to be shown that their spacecraft represents a better value when compared with U.S. manufactured products on the basis of service provided or price per transponder-year. The term service, as used here, includes the obvious factors of responsiveness, timeliness and reliability, as well as the less obvious factor of technical serviceability. Our spacecraft customers place rigid technical demands on signal reproduction in satellite retransmission that can only be achieved with sophisticated engineering and components. We have serious doubts that Russian manufactured spacecraft are capable of performing to the level expected by Western operators of communications satellites.

The Russians do not have EXPRESS satellites "on the shelf", and must acquire components and engineering in the presently inflated environment. They cannot continue to sell spacecraft without due consideration of cost and profit as they transition to a market economy.

b. If the U.S. gives the Russians Western currency from space launches under the agreement, and then Russia uses the cash to improve its satellite products, wouldn't you say that's a mistake?

**ANSWER:** The quality gap between the performance of Russian and U.S. manufactured spacecraft can only be closed with time, experience, the availability of high reliability parts not presently available in Russia, and failure of Western manufacturers to continue to improve their products. Required parts will ultimately become available, but will result in a significant increase in cost of the Russian spacecraft. Additionally, competitiveness of U.S. manufactured satellites will continue to improve, presenting a moving target for the Russians.

Question 2b implies a financial relationship between manufacturers of spacecraft and launch vehicles that may not exist. Both industries face a difficult transition, and it has not been established that the fruits from the efforts of one would be funneled into an improvement in the health of the other. However, if such a relationship should exist, its impact would be exacerbated by Western insistence that Russia substantially increase their launch prices over that they proposed. In theory, greater profits would then become available to improve competitiveness of spacecraft.

With the cost of transportation to space representing a substantial percentage of an operational communications satellite, a significant reduction in launch cost could result in a corresponding reduction in price to the end user, creating additional communications services and jobs. A study of the total impact to the nation from use of Russian launch vehicles for commercial launches would be very interesting. It is possible that jobs and services created as a result of reduced communications cost could far outweigh the impact of loss of additional non-government launches.

c. With or without U.S. currency, Russia is able to sell satellites. How is the satellite business for Russia these days?

**ANSWER:** As mentioned in response 2.a, Russia has reportedly sold EXPRESS satellites to Rimsat, and obtained options for spacecraft from INTELSAT. The details of these transactions have not been made public, and therefore their true value is unknown. However, if INTELSAT should exercise its options for the EXPRESS spacecraft, it would provide the Russians with a significant amount of credibility and a guaranteed source of hard currency. A number of space-based programs have been announced, both government and commercial. Some will not be funded, but there are indications that several will go forward and assist in holding the engineering and manufacturing team together.

Q3. How does their entry to the launch segment help their ability to compete in the spacecraft business?

ANSWER: The Russian spacecraft do not have the longevity, reliability, or serviceability of U.S. manufactured satellites. However, by proposing delivery on orbit, the combined cost savings accruing from the spacecraft plus launch could well be pivotal in reaching a procurement decision.

Q4. As a spacecraft maker, how do you rate the Russian spacecraft technology?

ANSWER: Approximately equal in performance to that of U.S. spacecraft of the early 1980s, but much heavier than modern spacecraft. Russia has not experienced the mass threshold that limited spacecraft design in the United States. Russian launch capability has outpaced spacecraft development, making it possible for satellite designers to place a lower priority on weight reduction. In the United States, launch vehicle limitations, including cost and/or capability, have been a limiting factor in spacecraft design.

Q5. Space Systems/Loral did, in fact, obtain some Russian spacecraft technology under an import approval granted last year.

a. Would you describe the Russian thrusters Loral recently acquired from the Russians?

ANSWER: The Stationary Plasma Thruster (SPT) is classified as an electrical thruster rather than chemical. Using electrical energy gathered from solar cells and stored in batteries, these thrusters will dramatically improve the operating efficiency of a spacecraft by reducing total satellite weight by up to 20 percent, reducing fuel consumption and enabling the use of a smaller launch vehicle, ultimately resulting in lower costs to the customer. No similar technology is currently available in the West.

b. Is it fair for us to infer that Loral considers Russian satellite technology to be competitive with U.S. spacecraft technology?

ANSWER: No. They are not competitive from the standpoint of reliability, power, pointing accuracy, sophistication, mass, or customer service. They are marginally competitive on a price per transponder-year basis if launched on a Russian launch vehicle. However, if launch cost and insurance were equal to that paid by Western manufacturers, they would not be competitive by any of the listed criteria.

c. If not, when do you believe they will be competitive with the U.S.?

ANSWER: If it is assumed that Russia is successful in its transition to a true market economy, and it is required that a profit be made from the transaction, it is doubtful the Russians will be able to close the competitive gap in the next 10 years. If based on current Russian cost accounting techniques, or lack thereof, they will become substantially more competitive as soon as they have sufficient hard currency to import needed high reliability components. On a technology basis, much of the required

knowledge exists in Russia. Many of the high tech components are missing, as are experience and the necessity to economize on mass and power.

Competition in satellite based communications entails more than price, quality and reliability. It also involves customer service. Spacecraft manufactured in the U.S. have set a global standard in all of these, a standard that will be exceedingly difficult for the Russians to equal.

Customer service in a competitive world is a new concept to Russian spacecraft manufacturers. Responding to specific design and test requirements, mid-contract modifications, participation in design reviews, system tests, etc. is routine at Space Systems/Loral, and is a service customers have come to expect. Services of this nature, in conjunction with requirements to produce unique spacecraft in small quantities and competitive prices, will not come rapidly or easily for Russia, but will be necessary before they can be considered truly competitive.

### Additional Questions for Mr. Dorfman

1. What is the key feature of a launch for your company and your customers?
    - a. Is it price? Reliability? What do you consider most important when considering the launch service required to put one of your satellites in use?
    - b. Of the many attributes you and your customers require, is there anything that says "BUY AMERICAN?"
  2. Are the Russians in the commercial satellite business today?
    - a. Why wouldn't the Russians start dumping satellites on the world market?
    - b. If the U.S. gives the Russians Western currency from space launches under the agreement, and then Russia uses the cash to improve its satellite products, wouldn't you say that's a mistake?
    - c. With or without U.S. currency, Russia is able to sell satellites. How is the satellite business for Russia these days?
  3. How does their entry to the launch segment help their ability to compete in the spacecraft business?
4. Mr. Dorfman, as you pointed out, you were here not too long ago in your capacity as Chairman of the Commercial Space Transportation Advisory Committee, or COMSTAC. You testified in February that trade controls such as holding up export licenses was one element of a "defensive" business strategy, and that a new launch system, for example, is one part of an "offensive" strategy.
- a. Does the agreement with the Russians mean we are letting our guard down? What is the "defensive" strategy now that we are permitting the Russian entry to the launch business?

- b. Along these same lines, are there other elements to the "offensive" strategy besides a new rocket system?
- 5. Today you reiterated your call for development of the "spacelifter" launch vehicle. Comparing such a new system with the Russian Proton or the Chinese Long March, how long would it take for us to develop?
- 6. Speaking as a buyer, when would you be as confident in its reliability as you are in the Chinese system?

- 1a. Reliability is the most important factor in launch services. Price is important if we decide quality is acceptable. Sometimes, our customers introduce geo-political considerations into the equation. A failed launch is expensive, in terms of replacement manufacturing times, failed or interrupted service, and higher insurance premiums.
- 1b. Our US Government customers require that their spacecraft be launched on US vehicles. Our commercial customers are more flexible with their choice of launch vehicles and they generally factor in price, quality, and geo-political considerations when making their selection decision.
- 2a. Today, Russian satellite technology and reliability are not up to Western standards. If allowed free and unconstrained access, however, the Russians would probably attempt to saturate the market place with their satellites. Nonetheless, communication satellites are not their strength. I question their quality. So do the Russians.

According to an article published earlier this year in Moskovskaya Pravda, the status of Russian "...domestic satellite communications is awful. ...Only respect for their developers prevents them from being termed substantially outdated". Pravda added that the state would be able to fund only 9.8 percent of the current Russian space program and further stated that foreign investors and private users would have to make up the shortfall. Perhaps with an eye to future sales, the Russians have announced an ambitious plan to upgrade the quality of their communication satellites to the point necessary to make them competitive in the world market.

- 2b. If the Russians can plow the cash earned their commercial launches back into a R&D program designed to enhance the performance and total quality of their spacecraft, they could become more competitive, although they will have considerable ground to make up.

We are watching this situation closely. We are concerned, just as we would be with any new prospective competitor. The recent sale or lease of the new Russian Express system to Intelsat may give additional credibility to the Russian satellite industry, if Intelsat completes the transaction.

- 2c. I have no direct knowledge of the status of the Russian satellite industry.
3. I believe that there is limited coupling between the launch industry and the spacecraft industry.
- 4a. I don't believe that the agreement as negotiated by USTR, which allows the Russians to launch eight US-manufactured satellites to geosynchronous orbit between mid-1993 and 31 December 2000, is much more than a reflection of current geo-political realities.

The agreement has yet to be released to US industry. However, if our understanding of the agreement is correct, the Russians would not be allowed to discount launch prices by more than 7.5 percent below those offered by competitive US and Western European launch



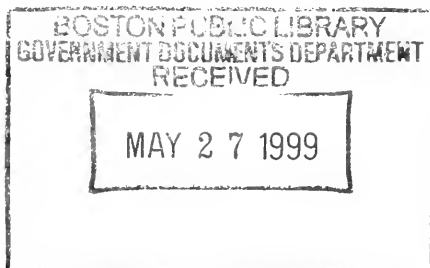
companies. There will be additional expenses and inconveniences on top of the discounted price that, in my opinion, will act to further reduce the attractiveness of the Russian offering.

The purported lack of specificity in the agreement for spacecraft inserted into low earth orbit does concern us. The USTR rules and quotas should apply evenly across the board, irrespective of orbit, to ensure a level playing field and a fair, open competition. If USTR does not do this, it risks altering the market forces between geostationary and LEO satellite systems. We request your support to ensure that we are left with a level playing field.

- 4b. We need a new launch system; we need upgraded launch facilities; we need to reduce the "standing army" attendant with each of our government and commercial launches. Until the US upgrades the quality of its launchers and lowers the cost of its launches, it will not be competitive.
5. From our perspective, there is nothing that a determined US Government-industry team cannot do. We are the best in the world. We merely need resolve, direction, funding - and a great deal less red tape. We should not be satisfied with less. In my opinion, the US should be able to produce the world's best, most cost effective expendable launch vehicle in less than five years.

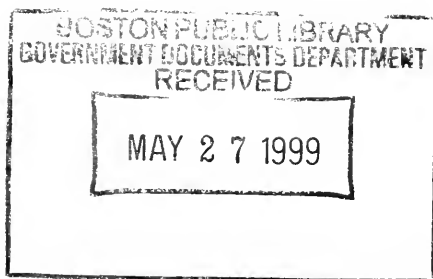
We have been working on a variant of a new launch system for over ten years. Nevertheless, we have very little to show for it. Its development has been arrested by interagency turf battles, overly complex procurement rules, sporadic funding streams, and changing objectives and direction. This need not be the model for the future. We need to remember that we produced the Mustang in six months and the atom bomb in less than four years.

6. Yes. A new ELV, developed specifically for satellite payloads, should be more reliable than any of today's launch vehicles.









ISBN 0-16-041362-1

